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# MONOGRAPH OF THE NORTH AND CENTRAL AMERICAN SPECIES OF THE GENUS SENECIO—PART II<sup>1</sup>

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## SECT. 8. TOMENTOSI Rydb.

§ 8. TOMENTOSI Rydb. Bull. Torr. Bot. Club 27 : 184. 1900, in major part; Greenm. Monogr. Senecio, I. Teil, 22, 24, 29. 1901, and in Engl. Bot. Jahrb. 32 : 18, 20, 25. 1902.

Perennial and usually caespitose herbs with erect or ascending stems, densely and permanently white-tomentose throughout, or tomentose in the early stages and more or less glabrate in age; inflorescence a few to many-headed corymbose cyme; heads radiate or discoid; achenes glabrous or hirtellous. Sp. 97-131.

## KEY TO THE SPECIES

- A. Plants at first tomentose, soon more or less glabrate especially on the upper leaf-surface; inflorescence several-headed; heads 8 to 12 mm. high.
  - a. Basal leaves ovate, 2 to 5.5 cm. broad, often subcordate ..... 97. *S. arizonicus*
  - b. Basal leaves obovate to oblanceolate, .5 to 2.5 cm. broad, not at all cordate.
    - a. Stems 1.5 to 6 dm. high; leaves sinuate-dentate to lyrate; offshoots short or subsessile.
      - I. Stem leafy at base, nearly naked above; leaves not sharply dentate.
        - 1. Plants sordid-tomentulose ..... 98. *S. sordidus*
        - 2. Plants white-tomentose, more or less glabrate.
          - \* Leaf-blade much longer than broad.
          - † Leaves more or less lyrate; achenes hirtellous or glabrous.
            - 0. Achenes hirtellous. 99. *S. neo-mexicanus*
            - 00. Achenes glabrous.. 99a. var. *Griffithsii*

<sup>1</sup> Issued April 3, 1918.

NOTE.—The present paper is continued from Ann. Mo. Bot. Gard. 4 : 15-36. 1917.

- †† Leaves not at all lyrate;  
achenes hirtellous or gla-  
brous.  
0. Achenes hirtellous.100. *S. oresbius*  
00. Achenes glabrous..101. *S. Hartmanii*
- \*\* Leaf-blade nearly or quite as  
long as broad.....102. *S. bernardinus*
- II. Stems tending to be more uniformly  
leafy; leaves subentire to sharply  
dentate.
1. Plants of New Mexico; achenes  
glabrous .....103. *S. eurypterus*
2. Plants of Colorado and New Mexico;  
achenes hirtellous .....104. *S. mutabilis*
- β. Stems 1 to 6 dm. high; leaves slightly den-  
tate to sinuately subbipinnate with deep  
rounded sinuses and usually blunt lobes;  
stems tending to be leafy and to produce  
numerous slender offshoots.....105. *S. Fendleri*
- γ. Stems .5 to 1.5 dm. high; leaves not at all  
lyrate, entire or dentate towards the apex.
- I. Leaves rotund-ovate to spatulate-linear;  
achenes glabrous or very rarely hir-  
tellous.
1. Plants of the Sierra Nevada Moun-  
tains .....106. *S. Muirii*
2. Plants of the Rocky Mountains.  
\* Leaf-blade nearly as broad as  
long.  
† Heads radiate .....107. *S. saxosus*  
†† Heads discoid .....107a. var. *toyabensis*
- \*\* Leaf-blade usually much longer  
than broad.  
† Heads radiate .....108. *S. werneriaefolius*  
†† Heads subdiscoid .....108a. var. *incertus*
- II. Leaves linear; achenes hispidulous....109. *S. Thurberi*
- B. Plants at first tomentose, soon more or less gla-  
brate especially on the upper leaf-surface; inflores-  
cence one to few-headed; heads 12 to 20 mm.  
high.
- a. Leaves thick in texture; rays pale yellow.
- a. Leaf margin not revolute.
- I. Involucral bracts 10-13 mm. long....110. *S. Actinella*
- II. Involucral bracts 7-8 mm. long.....111. *S. molinarius*
- β. Leaf-margin strongly revolute.....112. *S. gerberaefolius*
- b. Leaves thin in texture; rays deep orange.....113. *S. Greenei*
- C. Plants mostly permanently white-tomentose; in-  
florescence several-headed; heads 10 to 12 mm.  
high.
- a. Pubescence subappressed-sericeous.....114. *S. convallium*
- b. Pubescence white floccose-lanate.
- a. Lowermost leaves obovate to ovate, not at  
all cordate .....115. *S. Leonardii*
- β. Lowermost leaves ovate to oblong-lanceo-  
late, occasionally subcordate.....116. *S. tomentosus*
- γ. Lowermost leaves obovate to oblanceolate,  
not at all cordate.
- I. Stems 1 to 5 dm. high; leaves chiefly  
basal (except in *S. Harbourii*).

## 1. Plants of the United States.

\* Species of eastern United States; achenes hirtellous....117. *S. antenariifolius*

\*\* Species of western United States; achenes glabrous.

† Petioles of the basal leaves shorter than the blade; bracts of the involucre about 21 .....118. *S. canus*

†† Petioles of the basal leaves usually longer than the blade; bracts of the involucre about 13.

|| Radical leaves oblong-ob lanceolate to narrowly ob lanceolate (except in *S. Howellii* var. *lithophilus*).

## 0. Plants of the Rocky Mountains.

δ. Heads 10 to 12 mm. high; involucreal bracts 7 to 10 mm. long .....119. *S. Harbourii*

δδ. Heads 8 to 10 mm. high; involucreal bracts 5 to 7 mm. long .....120. *S. Purshianus*

## 00. Plants of Washington, Oregon, and the Great Basin.

δ. Leaves narrow, .5 to 1.5 cm. wide; heads radiate .....121. *S. Howellii*

δδ. Leaves broader, .5 to 3 cm. wide; heads radiate ....121a. var. *lithophilus*

δδδ. Heads discoid .....121b. var. *eradiatus*

|| || Radical leaves ovate.

0. Heads radiate....122. *S. oreopolus*

00. Heads discoid....122a. f. *aphanactis*

|| || Radical leaves spatulate .....123. *S. Hallii*

## 2. Plants of Mexico.

\* Foliage densely and permanently white-tomentose ....124. *S. candidissimus*

\*\* Foliage usually somewhat glabrate .....125. *S. bellidifolius*

- II. Stems 3 to 10 dm. high, more or less leafy stemmed.
1. Leaves relatively narrow, .5 to 1.5 cm. in width.
    - \* Leaves discolorous .....126. *S. loratifolius*
    - \*\* Leaves not discolorous.
      - † Stem-leaves auriculate at the base .....127. *S. cynthioides*
      - †† Stem-leaves not auriculate at the base.....128. *S. fastigiatus*
  2. Leaves relatively broad, 1.5 to 4 cm. in width.
    - \* Plants of Mexico.....129. *S. umbraculifer*
    - \*\* Plants of northwestern United States.
      - † Involucral bracts about 8; achenes glabrous .....130. *S. atratus*
      - †† Involucral bracts about 21; achenes hirtellous .....131. *S. sphaerocephalus*

**97. *S. arizonicus*** Greene, Bull. Torr. Bot. Club 10: 87. 1883; Gray, Syn. Fl. N. Am. 1<sup>2</sup>: 392. 1884, and ed. 2, 1886, excl. plant of Pringle; Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. 32: 20. 1902.

An herbaceous perennial; stems erect or nearly so, 1.5 to 4 dm. high, from a stoutish caudex, at first white-tomentose, soon glabrate above, permanently so at the base; lower leaves ovate to ovate-lanceolate, including the narrowly winged petiole 5 to 15 cm. long, 2 to 5.5 cm. broad, often subcordate, acute, unequally dentate, loosely floccose-tomentose in the early stages, more or less glabrate; upper stem-leaves sessile, lance-attenuate, somewhat clasping the stem, often much reduced and bract-like; inflorescence a subcorymbose cyme; heads 8 to 12 mm. high, radiate; involucre slightly calyculate; bracts of the involucre 13 to 21; ray-flowers 9 to 12, rays yellow; disk-flowers rather numerous; achenes slightly hirtellous.

Distribution: Arizona and New Mexico.

Specimens examined:

Arizona: Prescott, coll. of 1876, *E. Palmer* 264 (Gray Herb.); Lynx Creek, 31 May, 1883, *Rusby* (Gray Herb. and U. S. Nat. Herb. Nos. 47595, 47596), TYPE.

New Mexico: Ruidoso Creek, White Mountain region, Lincoln Co., alt. 2030 m., 29 June, 1895, *Wootton* (U. S. Nat. Herb. No. 735294).

**98. *S. sordidus*** Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902.

*S. neo-mexicanus* Gray, Proc. Am. Acad. **19** : 55. 1883; Syn. Fl. N. Am. **12** : 392. 1884, and ed. 2, 1886, in part, as to plant of Greene.

An herbaceous perennial; stem erect, 5 to 6 dm. high, tawny tomentulose at the base and in the leaf-axils, nearly glabrous above, somewhat striate and more or less purplish; radical and lower stem-leaves petiolate, oblong-ob lanceolate in general outline, including the petiole 5 to 10 cm. long, 1 to 2.5 cm. broad, sublyrate and rather coarsely serrate-dentate, tawny tomentulose on both surfaces, somewhat glabrate above; upper stem-leaves gradually reduced, becoming sessile and bracteiform at the corymbose cyme; heads 10 to 12 mm. high, radiate; involucre campanulate, sparingly calyculate, glabrous or nearly so; involucral bracts about 21, linear-lanceolate, 6 to 7 mm. long, often purplish-tipped; ray-flowers 10 to 12, rays yellow; disk-flowers numerous; achenes glabrous.

Distribution: southwestern New Mexico.

Specimens examined:

New Mexico: dry wooded hills, near Silver City, 10 May, 1880, *E. L. Greene* (Gray Herb.), TYPE.

**99. *S. neo-mexicanus*** Gray, Proc. Am. Acad. **19** : 55. 1883; Syn. Fl. N. Am. **12** : 392. 1884, and ed. 2, 1886, mainly; Rydb. Bull. Torr. Bot. Club **27** : 186. 1900, in part; Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902; Wooton & Standley, Contr. U. S. Nat. Herb. **19** : 747. 1915, in part. Pl. 4, fig. 1.

*S. aureus* var. *borealis* Gray, Pl. Wright., pt. 2, p. 100. 1853, and in Bot. Mex. Bound. Surv. 103. 1859, not Torr. & Gray.

*S. Toumeyi* Greene, Pittonia **3** : 349. 1898.

*S. willowensis* Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902.

*S. Blumeri* Greene, Leaf. Bot. Obs. & Crit. **2** : 20. 1909.

*S. Encelia* Greene, Leaf. Bot. Obs. & Crit. **2** : 22. 1909.

An herbaceous perennial, more or less white-tomentose throughout; stems one to several from a short stoutish perpendicular or ascending rootstock, erect, 1.5 to 5.5 dm. high, white-tomentose below, sometimes becoming glabrous or nearly so above, striate; radical and lower stem-leaves petiolate, obovate to oblanceolate, 2 to 10 cm. long, .5 to 3 cm. broad, subentire to lyrate, at first densely white-tomentose on both surfaces, later more or less glabrate, thick in texture and often tinged with purple; upper stem-leaves sessile, irregularly dentate, gradually reduced towards the corymbose inflorescence; heads numerous, 10 to 12 mm. high, radiate; involucre campanulate, sparingly calyculate; bracts of the involucre usually 21, linear-lanceolate, 6 to 8 mm. long, tomentulose to nearly glabrous; ray-flowers 10 to 13, rays yellow; disk-flowers numerous; achenes hirtellous.

Distribution: mountains of New Mexico and Arizona.

Specimens examined:

New Mexico: Organ Mountains, coll. of 1852, *Wright 1415* (Gray Herb. and Phil. Acad. Nat. Sci. Herb.), TYPE; without definite locality, coll. of 1847, *Fendler 479* (Gray Herb.); Mimbres, coll. of 1853, *Dr. Henry* (Gray Herb.); Mogollon Mountains, Aug., 1881, *Rusby 212* (Mo. Bot. Gard. Herb.); Santa Magdalena Mountains, coll. of 1881, *Vasey* (U. S. Nat. Herb.); between Santa Fé and Cañoncito, alt. 2225 m., 23 June, 1897, *A. A. & E. G. Heller 3749* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); Organ Mountains, 25 May, 1898, *C. L. Herrick 232* (U. S. Nat. Herb.); Burro Mountains, Grant Co., alt. 1825 m., 20 June, 1903, *Metcalf 195* (U. S. Nat. Herb., Mo. Bot. Gard. Herb., and Univ. Ariz. Herb.); Organ Mountains, Dona Ana Co., 25 April, 1907, *Wootton 3370* (U. S. Nat. Herb.); Sandia Mountains, 2 May, 1914, *Ellis 22* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.).

Arizona: Mazatzal Mountains, coll. of 1867, *Dr. E. Smart* (U. S. Nat. Herb.); without definite locality, coll. of 1869, *Dr. E. Palmer* (U. S. Nat. Herb. No. 49345); Fort Lowell, coll. of 1880, *Lemmon 122* (Gray Herb.); Santa Catalina Mountains, April, 1880, *Lemmon* (Gray Herb.); Santa Catalina Moun-

tains, May, 1881, *Lemmon* (Univ. Chicago Herb. at Field Mus. No. 352207); Santa Rita Mountains, 2 May, 1881, alt. 1675 m., *Pringle* (U. S. Nat. Herb. and Phil. Acad. Nat. Sci. Herb.); Lynx Creek, 31 May, 1883, *Rusby* 665 in part (U. S. Nat. Herb.); Santa Catalina Mountains, 6 May, 1883, alt. 1220 m., *Pringle* (Gray Herb., U. S. Nat. Herb., and Phil. Acad. Nat. Sci. Herb.); high mountains, 14 May, 1884, *W. F. Parish* 125 (Gray Herb.); Fort Huachuca, coll. of 1890, *Dr. Patzky* (U. S. Nat. Herb.); Willow Spring, 10–20 June, 1890, *Dr. E. Palmer* (Gray Herb.); Fort Huachuca, 26 April–21 May, 1890, *Dr. E. Palmer* 438 (U. S. Nat. Herb.); Pinal Mountains, 26 May, 1890, *M. E. Jones* (U. S. Nat. Herb. No. 220118, and Mo. Bot. Gard. Herb.), *type* of *S. Encelia* Greene; Santa Catalina Mountains, 19 May, 1892, *Toumey* 689 (U. S. Nat. Herb.); Chiricahua Mountains, 20 Sept., 1896, *Toumey* 130 (Greene Herb., Univ. of Notre Dame), *type* of *S. Toumeyi* Greene; vicinity of Flagstaff, alt. 1675 m., 31 May, 1898, *MacDougal* 12 in part (Gray Herb.); Flagstaff, 6 June, 1901, *L. F. Ward* (U. S. Nat. Herb. No. 410253); hills above Rosemont, 13 March–23 April, 1903, *Griffiths* 4139 (U. S. Nat. Herb.); Santa Catalina Mountains, Sabino Cañon, 9 April, 1905, *Thornber & Terrell* (Univ. Ariz. Herb.); stony knolls, Barfoot Park, Chiricahua Mountains, alt. 2435 m., June, 1907, *Blumer* 151 (U. S. Nat. Herb. No. 561506), *type* of *S. Blumeri* Greene; same locality, 1 July, 1907, *Blumer* 1553 (U. S. Nat. Herb., Mo. Bot. Gard. Herb., Field Mus. Herb., and Univ. Ariz. Herb.); Santa Catalina Mountains, 15 April, 1908, *J. N. Rose* 11815 (U. S. Nat. Herb.); Miller's Cañon, Huachuca Mountains, 8 June, 1909, *Goodding* 108 (Univ. Ariz. Herb.); steep slopes, Huachuca Mountains, May, 1912, *Goodding* 1307 (U. S. Nat. Herb. and Univ. Ariz. Herb.); near Soldier Camp, Santa Catalina Mountains, Pima Co., alt. 2345 m., 16 May, 1914, *Shreve* (Mo. Bot. Gard. Herb.); Oak Camp, Santa Catalina Mountains, Pima Co., alt. 1425 m., 19 May, 1914, *Shreve* (Mo. Bot. Gard. Herb.).

Var. **Griffithsii** Greenm. var. nov.

*S. arizonicus* Gray, Syn. Fl. N. Am. 1<sup>2</sup>: 392. 1884, and ed. 2, 1886, in part, not Greene, i.e. as to plant of Pringle.



Stems erect, 2.5 to 4.5 dm. high, simple or branched; leaves and inflorescence similar to the species; achenes glabrous.

Specimens examined:

Arizona: Santa Rita Forest Reserve, 31 March–23 April, 1903, *David Griffiths 4212* (Mo. Bot. Gard. Herb.), TYPE; Santa Rita Mountains, alt. 1675 m., 2 May, 1881, *Pringle* (Gray Herb.); near Fort Huachuca, coll. of 1894, *T. E. Wilcox 19* (U. S. Nat. Herb.).

**100. *S. oresbius* Greenm. nom. nov.**

*S. oreophilus* Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902, name only; Ann. Mo. Bot. Gard. **1** : 267. 1914, not Dusén.

An herbaceous perennial; stem solitary, erect, about 2.5 dm. high, tomentulose; leaves chiefly basal, rather numerous, petiolate, oblong-cuneate, including the petiole 3 to 9 cm. long, .5 to 2.5 cm. broad, subentire to sinuate-dentate towards the rounded apex, at first white-tomentulose, soon glabrate; stem-leaves few, much reduced, sessile, somewhat auriculate at the base, slightly expanded and dentate towards the apex; inflorescence a terminal corymbose cyme; heads numerous, about 1 cm. high, radiate; involucre campanulate, sparingly calyculate, slightly tomentulose at the base, otherwise glabrous; bracts of the involucre about 21, linear-lanceolate, 7 to 8 mm. long; ray-flowers 10 to 12, rays yellow; disk-flowers numerous; achenes hirtellous.

Distribution: known only from the type locality.

Specimen examined:

New Mexico: Pinos Altos Mountains, 6 May, 1880, *E. L. Greene* (Gray Herb. and Greene Herb., Univ. of Notre Dame), TYPE.

**101. *S. Hartmanii* Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902.**

An herbaceous perennial, more or less floccose-tomentose throughout; stems one to several from a perpendicular or ascending rootstock, 1.5 to 3.5 dm. high, simple, somewhat glabrate above, striate; leaves mostly basal, obovate to oblanceolate, 2 to 10 cm. long, .5 to 3 cm. broad, entire to crenate-

dentate, abruptly to gradually contracted below the middle into a narrowly winged petiole, at first densely white-tomentose, later glabrate, thickish in texture and often more or less tinged with purple; upper stem-leaves much reduced, sessile, oblanceolate to linear and bracteiform; inflorescence a terminal corymbose few to several-headed cyme; heads 10 to 12 mm. high, radiate; involucre campanulate, sparingly calyculate, tomentulose to nearly glabrous; bracts of the involucre about 21, linear-lanceolate, 6 to 8 mm. long; ray-flowers 13, rays yellow; disk-flowers numerous, 50 to 70; achenes glabrous.

Distribution: northern Mexico.

Specimens examined:

Chihuahua: Puerta de St. Diego, alt. 1980 m., 12 April, 1891, *C. V. Hartman 623* (Gray Herb. and U. S. Nat. Herb.), TYPE.

Sonora: Guadalupe Cañon, *E. K. Smith* (Gray Herb. and Field Mus. Herb. No. 42927); without definite locality, coll. of 1890, *C. E. Lloyd 405* (Gray Herb.).

**102. *S. bernardinus*** Greene, *Pittonia* **3** : 298. 1898; Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902.

*S. ionophyllus* var. *bernardinus* Hall, Univ. Calif. Pub. Bot. **3** : 232. 1907.

*S. neo-mexicanus* Gray, Proc. Am. Acad. **19** : 55. 1883; Syn. Fl. N. Am. **1**<sup>2</sup>: 392. 1884, and ed. 2, 1886, in part, as to plant of Parish.

An herbaceous perennial, at first floccose-tomentose throughout, more or less glabrate; stems one to several, 1.5 to 3 dm. high, simple or branched; leaves mostly basal, usually numerous, often forming a rather dense rosette, round-ovate, obovate to spatulate-cuneate, 2 to 6 cm. long, .5 to 1.5 cm. broad, thick in texture, entire or dentate towards the apex, narrowed at the base into a slender petiole much exceeding the blade, and occasionally bearing a pair of small lobes at the base of the blade, the older persistent leaves becoming nearly or quite glabrous; upper stem-leaves few, more or less reduced, narrowly cuneate and dentate towards the apex to linear-lanceolate and entire; inflorescence a terminal few to

several-headed corymbose cyme; heads 10 to 12 mm. high, radiate; involucre campanulate, sparingly calyculate, tomentulose; bracts of the involucre 13 to 21, linear-lanceolate, 6 to 9 mm. long; ray-flowers 8 to 10, rays yellow; disk-flowers numerous; achenes glabrous.

Distribution: mountains of southern California.

Specimens examined:

California: Bear Valley, San Bernardino Mountains, alt. 1980 m., Aug., 1882, *S. B. & W. F. Parish 1450* (Greene Herb., Univ. of Notre Dame, Gray Herb., and U. S. Nat. Herb.), TYPE; Bear Valley, alt. 1980 m., 23 June, 1894, *S. B. Parish 3345* (Greene Herb., Univ. of Notre Dame, U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); Bear Valley, 16–20 June, 1895, *S. B. Parish 3718* (Greene Herb., Univ. of Notre Dame, and Gray Herb.); Bear Valley, 5 Aug., 1902, *Abrams 2891* (U. S. Nat. Herb., Phil. Acad. Nat. Sci. Herb., and Mo. Bot. Gard. Herb.); San Bernardino Mountains, Aug.-Sept., 1907, *Mrs. C. M. Wilder* (Dudley Herb., Stanford Univ. No. 82450); Bear Valley, alt. 1825 m., July, 1909, *Davidson 2159* (U. S. Nat. Herb.); Holcomb Valley, San Bernardino Mountains, alt. 2130 m., 16 June, 1916, *S. B. Parish 10878* (Mo. Bot. Gard. Herb.).

Var. **sparsilobatus** (Parish) Greenm. comb. nov.<sup>1</sup>

*S. sparsilobatus* Parish, Bot. Gaz. **38** : 462. 1904.

White floccose-tomentose throughout, slightly glabrate; stems 1.5 to 2 dm. high, erect; stem-leaves, except the uppermost, petiolate, 1 to 6 cm. long, 1 to 1.5 cm. broad, pinnately lobed with remote entire or dentate lobes; heads 10 to 12 mm. high; involucral bracts about 13; achenes glabrous.

Specimens examined:

California: trail from Barton Flats to South Fork of Santa Ana River, alt. 2130 m., June, 1904, *Mrs. H. E. Wilder* (Dudley

<sup>1</sup> An examination of the type specimen of *Senecio sparsilobatus* Parish, which has been loaned to me from the Dudley Herbarium, through the courtesy of Professor Leroy Abrams, shows this plant to be more closely allied to *S. bernardinus* Greene than to *S. ionophyllus* Greene; it accordingly has been so treated above. The several specimens cited under *S. ionophyllus* var. *sparsilobatus* in my recent paper, indicated below, represent a marked variation from the type of this species and for these may be substituted the name *Senecio ionophyllus* Greene var. *intrepidus* Greenm. nom. nov. (*S. ionophyllus* var. *sparsilobatus* Hall, Univ. Calif. Pub. Bot. **3** : 232. 1907; Greenm. Ann. Mo. Bot. Gard. **4** : 34. 1917, not *S. sparsilobatus* Parish).

Herb., Stanford Univ. No. 82451), TYPE; San Bernardino Mountains, July, 1904, *Mrs. H. E. Wilder* (U. S. Nat. Herb. No. 444995).

**103. *S. eurypterus* Greenm. nom. nov.**

*S. appendiculatus* Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902, name only; Ann. Mo. Bot. Gard. **1** : 265. 1914, not DC.

*S. neo-mexicanus* Gray, Proc. Am. Acad. **19** : 55. 1883; Syn. Fl. N. Am. **12**: 392. 1884, and ed. 2, 1886, in part, as to plant of Thurber; Wooton & Standley, Contr. U. S. Nat. Herb. **19** : 747. 1915, in part.

An herbaceous perennial, more or less white-tomentose throughout; stems one to several from an ascending or erect rootstock, 1.5 to 4 dm. high, at first tomentose, later somewhat glabrate, subfoliaceous; leaves oblong-obovate to oblanceolate, including the petiole 2 to 14 cm. long, .5 to 2.5 cm. broad, usually sharply dentate, rarely entire, in the younger stages white-tomentose on both surfaces, later more or less glabrate; stem-leaves similar, the uppermost sessile and usually amplified into an irregularly dentate subauriculate half-clasping base; inflorescence a terminal few to several-headed corymbose cyme; heads 10 to 12 mm. high, radiate; involucre campanulate, minutely calyculate, sparingly tomentulose; bracts of the involucre about 21, linear-lanceolate, 5 to 7 mm. long; ray-flowers about 13, rays yellow; disk-flowers numerous, 60 to 70; achenes glabrous.

Distribution: mountains of New Mexico.

Specimens examined:

New Mexico: Mule Spring, May, 1851, *Thurber 280* (Gray Herb.), TYPE; without definite locality, *Mexican Boundary Survey 662* (U. S. Nat. Herb.); Santa Magdalena Mountains, coll. of 1881, *Vasey* (U. S. Nat. Herb. Nos. 49347, 156602); Organ Mountains, Dona Ana Co., 25 April, 1895, *Wooton* (U. S. Nat. Herb.); Filmore Cañon, Organ Mountains, Dona Ana Co., 29 April, 1899, *Wooton* (U. S. Nat. Herb.); Organ Mountains, Dona Ana Co., coll. of 1900, *Wooton* (C. C. Deam Herb.); Van Patten's, Organ Mountains, 9 June, 1906, *Standley* (U. S. Nat.

Herb. and Mo. Bot. Gard. Herb.) ; Organ Mountains, 25 April, 1907, *Wooton 3370* (Mo. Bot. Gard. Herb.) ; Lake Valley, coll. of 1915, *Mrs. W. G. Beals* (U. S. Nat. Herb.).

**104. *S. mutabilis*** Greene, *Pittonia* **4** : 113. 1900; Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902; Nelson in Coulter & Nelson, Manual Cent. Rocky Mountains, 583, 1909, in part, excl. synonymy; Wooton & Standley, Contr. U. S. Nat. Herb. **19** : 747. 1915.

*S. cognatus* Greene, *Pittonia* **4** : 114. 1900.

*S. aurellus* Rydb. Bull. Torr. Bot. Club **27** : 182. 1900.

An herbaceous perennial, usually loosely floccose-tomentulose; stems one to several from an ascending or perpendicular rootstock, erect or nearly so, 1.5 to 4 dm. high; leaves obovate to oblanceolate, including the petiole 2 to 12 cm. long, .5 to 1.5 cm. broad, rounded at the apex, subentire, dentate or sublyrate, at first white-tomentulose on both surfaces, later more or less glabrate; stem-leaves similar, more or less reduced, oblanceolate to narrowly lanceolate, distinctly petiolate to sessile, somewhat lacinate to entire; inflorescence a terminal few to several-headed corymbose cyme; heads 8 to 10 mm. high, radiate; involucre campanulate, sparingly calyculate, glabrous or slightly tomentulose; bracts of the involucre 13 to 21, linear-lanceolate, 5 to 7 mm. long; ray-flowers 8 to 12, rays yellow; disk-flowers 40 to 60; achenes hispidulous.

Distribution: Colorado to Arizona.

Specimens examined:

Colorado: Arboles, June, 1899, *C. F. Baker 712, 713* (Greene Herb., Univ. of Notre Dame, Gray Herb., Berlin Herb., and Mo. Bot. Gard. Herb.), TYPE; Los Pinos, May, 1899, *C. F. Baker* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); Cimarron, alt. 2000 m., 6 June, 1901, *C. F. Baker 19, 33* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); Marshall Pass, alt. 3045 m., 19 July, 1901, *C. F. Baker 516* (Gray Herb., Univ. Calif. Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); Rico, alt. 2895 m., 1 July, 1898, *Colo. State Agr. Coll. 3046* (U. S. Nat. Herb.); Surface Creek, Delta Co., alt. 2040

m., May, 1892, *Purpus* 76 (Univ. Chicago Herb. at Field Mus.); La Plata Cañon, alt. 2740 m., 11 July, 1898, *Baker, Earle & Tracy* 469 (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); Mancos, alt. 2130 m., 23 and 24 June, 1898, *Baker, Earle & Tracy* 63 (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); Mancos, alt. 2130 m., 24 June, 1898, *Baker, Earle & Tracy* 998 (Mo. Bot. Gard. Herb. and U. S. Nat. Herb.), *type* of *S. aurellus*; Harmon's Lake, 24 July, 1898, *Baker, Earle & Tracy* 999 (Mo. Bot. Gard. Herb.); Piedra, 11 July, 1899, *C. F. Baker* (Greene Herb., Univ. of Notre Dame, U. S. Nat. Herb., Kew Herb., and Mo. Bot. Gard. Herb.), *type* of *S. cognatus*.

New Mexico: High Rolls and vicinity, alt. 1825 m., 21–28 May, 1902, *H. L. Viereck* 30 (Phil. Acad. Nat. Sci. Herb.); hills south of Tierra Amarilla, Rio Arriba Co., alt. 2300 m., 18 April–25 May, 1911, *Eggleston* 6546 (U. S. Nat. Herb.); pass southeast of Tierra Amarilla, alt. 2320 m., 18 April–25 May, 1911, *Eggleston* 6602 (U. S. Nat. Herb.).

Arizona: Apache Verde Road, east of Baker Butte, 1 June, 1900, *Coville* 1043 (U. S. Nat. Herb.).

**105. *S. Fendleri*** Gray, Mem. Am. Acad. N. S. [Pl. Fendl.] 4 : 108. 1849; Pac. Rail. Rept. 4 : 111. 1856; Proc. Acad. Nat. Sci. Phil. p. 68. 1863; Syn. Fl. N. Am. 1<sup>2</sup> : 392. 1884, and ed. 2, 1886; Coulter, Manual Rocky Mountain Region, 211. 1885; Greene, Pittonia 4 : 112. 1900; Rydb. Bull. Torr. Bot. Club 27 : 188. 1900; Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. 32 : 20. 1902; Rydb. Fl. Colo. 396. 1906; Nelson in Coulter & Nelson, Manual Cent. Rocky Mountains, 581. 1909, in part; Daniels, Univ. Mo. Studies, Sci. Ser. 2 : 251. 1911; Clements & Clements, Rocky Mountain Flowers, 293. 1914; Wootton & Standley, Contr. U. S. Nat. Herb. 19 : 746. 1915.

*S. Nelsonii* Rydb. Bull. Torr. Bot. Club 26 : 483. 1899, and 27 : 172. 1900; Nelson in Coulter & Nelson, Manual Cent. Rocky Mountains, 581. 1909.

*S. salicinus* Rydb. Bull. Torr. Bot. Club 27 : 186. 1900.

*S. rosulatus* Rydb. Bull. Torr. Bot. Club 27 : 188. 1900.

*S. Fendleri lanatus* Osterhout, Bull. Torr. Bot. Club **31** : 358. 1904.

*S. lanatifolius* Osterhout, Bull. Torr. Bot. Club **32** : 612. 1905; Daniels, Univ. Mo. Studies, Sci. Ser. **2** : 252. 1911.

*S. rosulatus* mut. *primulinus* Cockerell, Torreya **13** : 272. 1913.

*S. confertus* Nelson in Herb.

*S. rosulatus coryphocolus* Clements in Herb.

An herbaceous perennial, at first white-tomentose, somewhat glabrate; stems one to several, erect or nearly so, simple or branched, 1 to 6 dm. high, frequently bearing short or elongated and slender offshoots at the base of the stem and becoming densely cespitose, uniformly leafy or with the upper leaves more or less reduced; lower leaves petiolate, oblanceolate to oblong-ovate in general outline, 2 to 12 cm. long, .5 to 3.5 cm. broad, subentire to sinuately lobed or even subbipinnate with deep rounded sinuses and crowded, often somewhat crenate or plaited, rounded and entire to acutely dentate lobes, more or less glabrate especially on the upper surface; upper leaves sessile, similar or reduced to lanceolate, dentate to subentire bracts; inflorescence a terminal several to many-headed corymbose cyme; heads 7 to 10 mm. high, radiate; involucre campanulate, sparingly calyculate; bracts of the involucre usually 13, linear-lanceolate, 4 to 6 mm. long, tomentulose to glabrous; ray-flowers 7 to 12, rays yellow; disk-flowers 30 to 40; achenes glabrous.

Distribution: Wyoming to New Mexico.

Specimens examined:

Wyoming: Wind River Mountains, 9 Aug., 1894, *A. Nelson* (Gray Herb.); Pole Creek, hillside, Table Mountains, 2 June, 1894, *A. Nelson 124* (Gray Herb.); on granite slopes, Sand Creek, Albany Co., 30 June, 1900, *A. Nelson 6996* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); dry gravelly slopes, Centennial, Albany Co., 27 July, 1902, *A. Nelson 8697* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); Green Top, 29 June, 1897, *A. Nelson 3217* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); Cummins, 28 July, 1895, *A. Nelson 1492* (Gray Herb., U. S. Nat. Herb., and Mo.

Bot. Gard. Herb.) ; foothills west of Islay, alt. 3050 m., 25 June, 1909, *Merritt Cary 321* (U. S. Nat. Herb.) ; near Cheyenne, 25 June, 1896, *E. L. Greene* (Greene Herb., Univ. of Notre Dame) ; near Sherman, 29 July, 1893, and 29 June, 1896, *E. L. Greene* (Greene Herb., Univ. of Notre Dame, Nos. 47410, 47409).

Colorado: foothills west of Fort Collins, alt. 1675 m., 24 May, 1896, *C. F. Baker* (Mo. Bot. Gard. Herb.) ; Front Range, alt. 3050 m., 8 July, 1896, *Crandall* (Mo. Bot. Gard. Herb.) ; tributaries of the South Fork of the Cache la Poudre River, July, 1896, *Pammel 285* (Mo. Bot. Gard. Herb.) ; Chamber's Lake, alt. 2895 m., 1 Aug., 1896, *C. F. Baker* (Mo. Bot. Gard. Herb. and Greene Herb., Univ. of Notre Dame, No. 47406) ; rocky ridges, Pinkham Creek, 7 July, 1903, *Goodding 1484* (U. S. Nat. Herb., Phil. Acad. Nat. Sci. Herb., and Mo. Bot. Gard. Herb.) ; Livermore, Larimer Co., 27 May, 1897, *Osterhout 33* (Greene Herb., Univ. of Notre Dame) ; Estes Park, 28 June, 1912, *Churchill* (J. R. Churchill Herb. and Mo. Bot. Gard. Herb.) ; Estes Park, 10 Aug., 1912, 22 June, 1913, and 10 June, 1916, *E. L. Johnston 754, 448, and 717* (Mo. Bot. Gard. Herb.) ; Estes Park, 22 June, 1913, *E. L. Johnston 854, 894* (U. S. Nat. Herb.) ; dry hills, Estes Park, coll. of 1913, *Cockerell* (U. S. Nat. Herb. No. 693295) ; Lyons, 24 May, 1916, *E. L. Johnston 814B, 818B* (Mo. Bot. Gard. Herb.) ; Allenspark, alt. 2560 m., 16 July, 1917, *Johnston & Hedgcock 173* (Mo. Bot. Gard. Herb.) ; Central City, colls. of July, 1884, and 17 Aug., 1885, *Letterman* (Mo. Bot. Gard. Herb.) ; along railroad track, Tolland, alt. 2740 m., 2 July, 1913, *Overholts* (Mo. Bot. Gard. Herb.) ; dry soil, Eldorado Springs, alt. 1615 m., 24 June, 1917, *Clokey 2812* (I. W. Clokey Herb. and Mo. Bot. Gard. Herb.) ; hillside, Tolland, alt. 2680 m., 19 July, 1917, *Clokey 2853* (I. W. Clokey Herb. and Mo. Bot. Gard. Herb.) ; mountain side, Glacier Lake, alt. 2770 m., 26 Aug., 1917, *Clokey 2941, 2954* (I. W. Clokey Herb. and Mo. Bot. Gard. Herb.) ; dry hillsides, Ward, alt. 2865 m., 13 Aug., 1916, *Clokey 2711* (I. W. Clokey Herb. and Mo. Bot. Gard. Herb.) ; Seven Lakes, alt. 3050 m., 9 Aug., 1884, *Letterman* (Mo. Bot. Gard. Herb.) ; Golden, 13 July, 1885, *Letterman 55, 85* (Mo. Bot. Gard.



Herb.); head-waters of Clear Creek, and alpine ridges lying east of Middle Park, coll. of 1861, *Parry 19* (Gray Herb., Mo. Bot. Gard. Herb., and Phil. Acad. Nat. Sci. Herb.), and *Parry 22* (Gray Herb. and Mo. Bot. Gard. Herb.); Lat. 39–41°, coll. of 1862, *Hall & Harbour 333* in part (Gray Herb., U. S. Nat. Herb., Phil. Acad. Nat. Sci. Herb., Field Mus. Herb., and Mo. Bot. Gard. Herb.); Rocky Mountains, Lat. 40–41°, Powell's Colo. Expl. Exp., 1868, *Vasey 340A* (Mo. Bot. Gard. Herb.); near Georgetown, 11 Aug., 1871, *Geo. Smith* (Phil. Acad. Nat. Sci. Herb.); wet mountain valley, base of Snowy Range, 24 July, 1872, *Redfield 503* (Mo. Bot. Gard. Herb.); Ute Pass, alt. 2740 m., Hayden's U. S. Geol. Survey, 4 July, 1873, *J. M. Coulter* (U. S. Nat. Herb. and Phil. Acad. Nat. Sci. Herb.); Bear Creek, Hayden's U. S. Geol. Survey, 24 June, 1873, *J. M. Coulter* (U. S. Nat. Herb.); gravelly slopes of Spring Creek Valley, above Idaho, 31 July, 1874, top of Douglas Mountains, near Empire, alt. 2895 m., 2 Aug., 1874, moraines on Clear Creek, 25 Aug., 1874, and Ute Pass, Manitou Springs, 22 Sept., 1874, *Engelmann* (Mo. Bot. Gard. Herb.); without definite locality, Sept., 1874, *O. Kuntze* (U. S. Nat. Herb.); Manitou Trail to Pikes Peak, 13 Aug., 1884, *Letterman* (Mo. Bot. Gard. Herb.); region of Pikes Peak, 14 Aug., 1913, *Macbride 2670* (Mo. Bot. Gard. Herb.); mountain sides near Georgetown, July, 1885, *Patterson 79* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); Ute Pass, alt. 2135 m., 21 July, 1886, *Trelease* (Mo. Bot. Gard. Herb.); Manitou, 16 Aug., 1886, *Fritchey* (Mo. Bot. Gard. Herb.); mountains above Manitou, alt. 2285 m., 27 May, 1892, *Crandall* (Mo. Bot. Gard. Herb.); Democrat, coll. of 1887, *Eleanor J. Pond* (U. S. Nat. Herb.); Georgetown, alt. 2590 m., 20 July, 1892, *Crandall* (Mo. Bot. Gard. Herb.); Upper Bear Creek, 24 July, 1889, *E. L. Greene* (Greene Herb., Univ. of Notre Dame, No. 47413); foothills, alt. 1980 m., 1 June, 1895, *Cowen 284* (U. S. Nat. Herb.); Georgetown, 17 Aug., 1895, *Shear 4517* (U. S. Nat. Herb.); Silver Plume, 21 Aug., 1895, *Shear 5000* (U. S. Nat. Herb.); Pikes Peak, 27 Aug., 1895, *Canby* (Gray Herb. and U. S. Nat. Herb.); above Beaver Creek, alt. 3050 m., 8 July, 1896, *Crandall 3090* (U. S. Nat. Herb.); on rocks in the aspen zone, Sil-

ver Plume, Clear Creek Cañon, alt. 3090 m., 19 Aug., 1896, *Holm* (Mo. Bot. Gard. Herb.); gulch, south of Rist Cañon, 15 June, 1898, *Crandall 3089* (Gray Herb.); Horsetooth Gulch, 7 June, 1899, *State Agr. Coll. Colo. 3083* (U. S. Nat. Herb.); Pikes Peak, 10 July, 1901, *Williamson* (Phil. Acad. Nat. Sci. Herb. and C. S. Williamson Herb.); Dark Cañon, alt. 2900 m., 19 July, 1901, *F. E. & E. S. Clements 109* (Gray Herb., Mo. Bot. Gard. Herb., and U. S. Nat. Herb.); Bottomless Pit, alt. 3850 m., 6 Aug., 1901, *F. E. & E. S. Clements 522* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); slopes of Cheyenne Mountain, Colorado Springs, 20 June, 1912, *Churchill* (J. R. Churchill Herb. and Mo. Bot. Gard. Herb.); Pikes Peak, 19 and 25 Aug., 1915, *Drushel* (J. A. Drushel Herb. and Mo. Bot. Gard. Herb.); Palmer Lake, 28 Aug., 1915, *Drushel* (J. A. Drushel Herb.); near Breckenridge, alt. 2895 m., Aug., 1901, *Mackenzie 238* (Phil. Acad. Nat. Sci. Herb.); Wolcott, Eagle Co., 11 July, 1902, *Osterhout 2667* (Gray Herb.); Twin Lakes, Wheeler's Exp., 1873, *Wolf & Rothrock 557* (Gray Herb. and U. S. Nat. Herb.); mountains of Colorado, coll. of 1870, *E. L. Greene 227* (Gray Herb.); gravelly places, South Cottonwood Gulch, Chaffee Co., alt. 2895 m., 9 and 29 July, 1892, *Sheldon 165, 167, 486* (U. S. Nat. Herb.); Sangre de Cristo Mountains, Aug., 1874, *Brandeggee 942* (Mo. Bot. Gard. Herb.); Mt. Ouray, region of Gunnison Watershed, alt. 3810 m., 20 Aug., 1901, *C. F. Baker 857* (Gray Herb., U. S. Nat. Herb., Greene Herb., Univ. of Notre Dame, and Mo. Bot. Gard. Herb.); dry hills, vicinity of Trinidad, alt. 1800–1950 m., 17 July, 1911, *Standley 6025* (U. S. Nat. Herb.); hills west of Trinidad, 14 June, 1917, *Johnston & Hedgcock 153* (Mo. Bot. Gard. Herb.); Mancos, July, 1890, *Eastwood* (U. S. Nat. Herb.); without definite locality, *Dapprich* (Pub. Mus. Milwaukee Herb. No. 8833).

New Mexico: uplands, Upper Canadian Valley, Catskill, coll. of 1895, *Mrs. O. St. John 71* (Gray Herb.); Baldy, 14 Aug., 1910, *Wooton* (U. S. Nat. Herb.); Rio Pueblo, 10 Aug., 1910, *Wooton* (U. S. Nat. Herb.); Jemez Mountains, alt. 3350 m., 4 Sept., 1906, *Vernon Bailey 1023* (U. S. Nat. Herb.); Pecos River, July, 1898, *G. E. Coghill 101* (Mo. Bot. Gard. Herb.);

Winsor's Ranch, Pecos River National Forest, alt. 3655 m., 13 July, 1908, *Standley 4351* (U. S. Nat. Herb., C. C. Deam Herb., and Mo. Bot. Gard. Herb.); Las Vegas, July, 1881, *Vasey* (U. S. Nat. Herb. and Greene Herb., Univ. of Notre Dame); Las Vegas, 23 and 24 June, 1891, *Dewey* (U. S. Nat. Herb.); foot of mountains along Santa Fé Creek, twelve miles above Santa Fé, June and July, 1847, *Fendler 478, 480 [444]* (Gray Herb., Berlin Herb., U. S. Nat. Herb., Torr. Herb., Phil. Acad. Nat. Sci. Herb., and Mo. Bot. Gard. Herb.), TYPE; Sandia Mountains, Whipple's Expl. for a Railway Route from the Mississippi River to the Pacific Ocean, 10 Oct., 1853, *Bigelow* (Gray Herb. and U. S. Nat. Herb.); Santa Fé Cañon, alt. 2435 m., 26 June, 1897, *A. A. & E. G. Heller 3774* (Gray Herb., Greene Herb., Univ. of Notre Dame, U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); Santa Fé Cañon, 3 Oct., 1913, *Rose, Fitch & Parkhurst 17754* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); Santa Fé Cañon, 6 Aug., 1910, *Wooton* (U. S. Nat. Herb.); among rocks and bushes, Sandia Mountains, July and Aug., 1914, *Miss Charlotte C. Ellis 342* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); Sandia Mountains, 4 Aug., 1910, *Wooton* (U. S. Nat. Herb.); El Capitan Mountains, alt. 2285 m., 28 July, 1910, *Baker, Earle & Tracy 208* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); Mescalero Reservation, White Mountains, 21 July, 1905, *Wooton* (U. S. Nat. Herb.); Wills Cañon, Sacramento Mountains, 20 Aug., 1901, *Wooton* (U. S. Nat. Herb.); James Cañon, Sacramento Mountains, 6 Aug., 1905, *Wooton* (U. S. Nat. Herb., Mo. Bot. Gard. Herb., and Univ. Ariz. Herb.).

(?) Kansas: without locality, *Prof. Snow* (U. S. Nat. Herb. No. 49321).

Var. **molestus** Greenm. var. nov.

Stems 2 to 3.5 dm. high, branched, sparingly floccose-tomentulose; basal and lower stem-leaves obovate to oblanceolate, including the petiole 2 to 9 cm. long, .5 to 2 cm. broad, rounded to submucronate at the apex, crenate-dentate to subentire, at first slightly tomentose, soon becoming glabrous or nearly so; uppermost stem-leaves similar, sessile, dentate or

entire; inflorescence and characters of the head like the species.

Specimens examined:

Colorado: Lat. 39–41°, coll. of 1862, *Hall & Harbour 333* in part (Gray Herb. and Field Mus. Herb.), TYPE; mountain sides near Georgetown, alt. 2435–3050 m., *Patterson 79* in part (Gray Herb.); Silverton, July, 1889, *Eastwood* (U. S. Nat. Herb. No. 215761).

An extreme form differing from the type of the species in becoming nearly glabrous, and in having merely sinuate-dentate to entire leaves. Numerous intermediate forms occur, such as Sheldon's No. 167, which connect the variety with the species.

Var. *canovirens* (Rydb.) Greenm. comb. nov.

*Senecio canovirens* Rydb. Bull. Torr. Bot. Club **27**:187. 1900.

Leaves oblanceolate, 2 to 15 cm. long, .5 to 2.5 cm. broad, subentire to sinuately lobed or even coarsely and unequally toothed.

Distribution: Pikes Peak, Colorado, to southern New Mexico.

Specimens examined:

Colorado: Pikes Peak, 25 Aug., 1915, *Drushel* (J. A. Drushel Herb. and Mo. Bot. Gard. Herb.); summit of wet mountains, Fremont Co., alt. 2730 m., 28 Sept., 1910, *Eggles-ton 6335* (U. S. Nat. Herb.).

New Mexico: White Mountains, Lincoln Co., alt. 2740 m., 30 July, 1897, *Wooton 244* (U. S. Nat. Herb., Gray Herb., Berlin Herb., Greene Herb., Univ. of Notre Dame, and Mo. Bot. Gard. Herb.); craters, Valencia Co., 28 July, 1906, *Wooton* (U. S. Nat. Herb.); Water Cañon, Magdalena Mountains, Socorro Co., 16 July, 1897, *C. L. Herrick 746* (U. S. Nat. Herb.); hillsides, Black Range, coll. of 1904, *Metcalf 1179* (U. S. Nat. Herb.); Organ Mountains, Dona Ana Co., alt. 2740 m., 4 Sept., 1897, *Wooton 493* (Mo. Bot. Gard. Herb. and Greene Herb., Univ. of Notre Dame, No. 47404).

The frequently elongated and coarsely toothed leaves on certain specimens give to this variety a very different aspect than is presented by typical specimens of *S. Fendleri*; but the variety appears to pass imperceptibly into the species through several of the specimens above cited, particularly Baker, Earle and Tracy's No. 208, and Wootton's collections from the White Mountains and the Sacramento Mountains. A striking characteristic of the species, as well as the variety, is shown on many of the carefully collected specimens, namely, the presence of short offshoots or more frequently elongated slender stolons which bear leaves from entire to sinuately lobed or even subbipinnate. This character is well shown by Fendler's No. 478 in the Royal Herbarium at Berlin and by Patterson's No. 79 in several American herbaria. The foliage of the species is extremely variable, but the characters of the inflorescence and heads are relatively constant. The two specimens, namely, Fendler's No. 478 and 480, on which Dr. Gray based the species, present a rather different appearance in leaf character, particularly the extent to which the leaves are divided; nevertheless, in the light of a large suite of specimens there can be no doubt but that Dr. Gray was perfectly right in regarding the two Fendler plants as conspecific; and furthermore the species seems to be even more inclusive than originally defined.

**106. *S. Muirii* Greenm.<sup>1</sup>**

*S. aureus* var. *borealis* Gray, Bot. Calif. 1: 412. 1876; Syn. Fl. N. Am. 1<sup>2</sup>: 391. 1884, and ed. 2, 1886, in part, not Torr. & Gray.

*S. werneriaefolius* Coville, Contr. U. S. Nat. Herb. 4: 140. 1893, not Gray.

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<sup>1</sup> *Senecio Muirii* Greenm. sp. nov., herbaceus perennis juventute ubique floccosotomentulosus plus minusve glabratus; caulibus solitariis vel pluribus a caudice multicipiti 5-10 cm. altis; foliis inferioribus subcoriaceis elliptico-ovatis vel spatulato-linearibus 1.5-5 cm. longis 1.5-10 mm. latis obtusis vel submucronato-acutis integris vel ad apicem paulo dentatis; foliis superioribus multo reductis bracteiformibus; capitulis solitariis vel in corymboso-cymosis paucicipitibus dispositis 6-10 mm. altis radiatis; involuero campanulato parce calyculato tomentuloso vel subglabrato; involucri squamis circiter 21 lineari-lanceolatis 6-8 mm. longis et basi petioli marginati saepe purpurascens; flosculis liguliferis 8-12, ligulis flavis; floribus disci 35-60; achaeniis glabris.—Collected on Mount Dana, California, alt. 3050-3655 m., Geol. Surv. Calif., 28 and 29 June, 1863, Brewer 1734, 1750 (Gray Herb. and U. S. Nat. Herb.), TYPE.

A low herbaceous perennial, floccose-tomentulose when young, more or less glabrate; stems solitary or several from a multicapital caudex, 5 to 10 cm. high; leaves mostly basal, thick and firm in texture, elliptic-ovate to spatulate-linear, 1.5 to 5 cm. long, 1.5 to 10 mm. broad, obtuse to submucronate-acute, entire or slightly dentate towards the apex; upper stem-leaves reduced to bracts; heads solitary or disposed in a few-headed corymbose cyme, 6 to 10 mm. high, radiate; involucre campanulate, sparingly calyculate, tomentulose to nearly glabrous; bracts of the involucre about 21, linear-lanceolate, 6 to 8 mm. long and, as well as the base of the margined petioles, often tinged with purple; ray-flowers 8 to 12, rays yellow; disk-flowers 35 to 60; achenes glabrous.

Distribution: Sierra Nevada Mountains.

Specimens examined:

California: Mt. Dana, alt. 3050–3655 m., 28 and 29 June, 1863, *Brewer 1734, 1750* (Gray Herb. and U. S. Nat. Herb.), TYPE; Mt. Dana, alt. 3655 m., coll. of 1863, *Brewer 2689, 2690* (Gray Herb. and U. S. Nat. Herb.); near Sonora Pass, alt. 3500 m., coll. of 1863, *Brewer 1904* (Gray Herb. and U. S. Nat. Herb.); Sierra Nevada, coll. of 1875, *John Muir 4450* (Mo. Bot. Gard. Herb.); near Whitney Meadows, Sierra Nevada, Death Valley Expedition, 20 Aug., 1891, *Coville & Funston 1662* (U. S. Nat. Herb.); near Mt. Whitney, Sierra Nevada, Death Valley Expedition, 1 Sept., 1891, *Vernon Bailey [Coville & Funston] 2052* (U. S. Nat. Herb.); Mono Co., 2 Aug., 1894, *Congdon 168* (Gray Herb.); Mt. Whitney, alt. 3960 m., 17 Aug., 1899, *E. B. Copeland 51* (U. S. Nat. Herb.); on Mt. Conness, 4 Aug., 1890, *Dr. Davidson* (Greene Herb., Univ. of Notre Dame, No. 48089).

107. *S. saxosus* Klatt, Anal. Naturhist. Hofmus. Wien 9 : 366. 1894; Greenm. Monogr. *Senecio*, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. 32 : 20. 1902; Blankinship, Mont. Agr. Coll. Sci. Studies 1 : 103. 1904; Greenm. Ann. Mo. Bot. Gard. 2 : pl. 20, fig. 2. 1915.

*S. petraeus* Klatt, Abh. Natur. Gesell. Halle 15 : 330. 1881, not Boiss. & Reuter; Gray, Proc. Am. Acad. 19 : 54. 1883;

Syn. Fl. N. Am. 1<sup>2</sup>: 389. 1884, and ed. 2, 1886, mainly; Coulter, Manual Rocky Mountain Region, 210. 1885, mainly; Clements & Clements, Rocky Mountain Flowers, 293. 1914.

*S. petrophilus* Greene, Pittonia 3 : 171. 1897, not Klatt.

*S. petrocallis* Greene, Pittonia 4 : 116. 1900; Rydb. Fl. Colo. 397. 1906.

*S. alpicola* Rydb. Mem. N. Y. Bot. Gard. 1 : 447. 1900.

*S. pentodontus* Greene, Pl. Baker. 3 : 26. 1901.

(?) *S. turbinatus* Rydb. Bull. Torr. Bot. Club 33 : 159. 1906.

*S. aureus* var. *alpinus* Gray, Am. Jour. Sci. III. 33 : 240. 1862; Proc. Acad. Nat. Sci. Phil. p. 68. 1863; Porter & Coulter, Fl. Colo. 81. 1874.

A low herbaceous perennial, white-tomentulose in the early stages, more or less glabrate; stems solitary or cespitose from a multicapital caudex, .5 to 1.5 dm. high; leaves chiefly basal, rotund-obovate to spatulate, including the petiole 1.5 to 10 cm. long, .5 to 2 cm. broad, entire or crenate-dentate towards the apex; upper stem-leaves few, much reduced, bracteiform; inflorescence a terminal few to several-headed corymbose cyme; heads 10 to 12 mm. high, radiate; involucre campanulate, sparingly calyculate; bracts of the involucre (13-)21, linear-lanceolate, acute, 7 to 10 mm. long; ray-flowers 10 to 12, rays yellow; disk-flowers numerous, 35 to 75; achenes glabrous.

Distribution: Rocky Mountains at high altitudes, Montana and Idaho, south to Colorado.

Specimens examined:

Montana: Black Butte, Tobacco Root Range, alt. 3200 m., 11 Aug., 1902, *Blankinship* (Gray Herb.); Cedar Mountain, alt. 3150 m., 16 July, 1897, *Rydb. & Bessey 5269* (U. S. Nat. Herb.).

Idaho: Slide Rock, Mackay (Bear Cañon), Custer Co., alt. 3150 m., 31 July, 1911, *Nelson & Macbride 1509* (Mo. Bot. Gard. Herb.); Saw-tooth Peak, near Pettit Lake, 27 July, 1895, *Henderson 3528* (U. S. Nat. Herb.); summit of Soldier Mountains, alt. 3350 m., 15 July, 1895, *Henderson 3230* (U. S. Nat. Herb.); alpine summits on exposed rock slides, Parker Mountain, Custer Co., alt. 2740 m., 17 July, 1916, *Macbride & Payson 3262* (Mo. Bot. Gard. Herb.).

Yellowstone National Park: on a rocky slope near the summit, The Thunderer, 13 July, 1899, *A. & E. Nelson 5822* (Gray Herb. and Mo. Bot. Gard. Herb.).

Colorado: head-waters of Clear Creek, and the alpine ridges lying east of "Middle Park," coll. of 1861 and 1862, *Parry 63* (Gray Herb.); Lat. 39–41°, coll. of 1862, *Hall & Harbour 329* (Gray Herb., Phil. Acad. Nat. Sci. Herb., Field Mus. Herb., and Mo. Bot. Gard. Herb.), TYPE; Lat. 39–41°, coll. of 1862, *Hall & Harbour 331* in part (U. S. Nat. Herb.); Mt. Parry, coll. of 1872, *Gray* (Gray Herb.); without definite locality or date, *Dr. Savell 11* (Gray Herb.); White House Mountain, alt. 3960 m., 9 Aug., 1873, *J. M. Coulter* (Phil. Acad. Nat. Sci. Herb.); Sangre de Cristo Range, Aug., 1873, *Brandeggee 727* (Mo. Bot. Gard. Herb.); Pikes Peak, alt. 1825–2130 m., Aug., 1876, *C. Mohr* (U. S. Nat. Herb.); Sawatch Range, alt. 1830–2130 m., Aug., 1880, *Brandeggee 9* (Gray Herb.); Gray's Peak, Aug., 1882, *Patterson & Beaty* (Mo. Bot. Gard. Herb.); Gray's Peak and vicinity, Aug., 1885, *Patterson 83* (Gray Herb. and Mo. Bot. Gard. Herb.); high mountains, alt. 2440–3655 m., coll. of 1893, *Purpus 462, 683, 693* (Univ. Chicago Herb. at Field Mus.); mountains above Boreas, alt. 3655 m., 2 Aug., 1895, *J. H. Cowen* (Mo. Bot. Gard. Herb.); foot of Gray's Peak, 23 Aug., 1895, *Shear 4634* (U. S. Nat. Herb.); Chicken Creek, west of Mt. Hesperus, alt. 3500 m., 13 July, 1898, *Baker, Earle & Tracy 589* (Mo. Bot. Gard. Herb.); Upper La Platte, 13 July, 1898, *Baker, Earle & Tracy 993* (Mo. Bot. Gard. Herb.); near Pagosa Peak, alt. 3500 m., 6 Aug., 1899, *Baker 714* (Berlin Herb. and Mo. Bot. Gard. Herb.); Carson, region of Gunnison Watershed, alt. 3500 m., 2 July, 1901, *Baker 309* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.), type of *S. pentodontus*; mountains above Ouray, alt. 3050–3655 m., Aug., 1901, *Baker 770* (Gray Herb. and Mo. Bot. Gard. Herb.); near Breckenridge, Summit Co., alt. 3960 m., Aug., 1901, *Mackenzie 1* (Phil. Acad. Nat. Sci. Herb., Univ. Ariz. Herb., and Mo. Bot. Gard. Herb.); mountain side, Ida Bell Mine, Summit Co., alt. 3500 m., 8 Aug., 1917, *Clokey 2903* (I. W. Clokey Herb. and Mo. Bot. Gard. Herb.); Clover Mountain, above Garfield, alt.



3900 m., 31 July, 1910, *Eggleston 6069* (U. S. Nat. Herb.); dry open soil, Leadville, alt. 3960 m., 23 June, 1916, *Clokey 2691* (I. W. Clokey Herb. and Mo. Bot. Gard. Herb.).

Var. *toiyabensis* Greenm. var. nov.

Stems 2 to 10 cm. high; heads one or two, terminating the nearly naked scapose stem, discoid; achenes glabrous.

Distribution: mountains of northeastern Nevada and Idaho.

Specimens examined:

Nevada: Bunker Hill, Toiyabe Range, alt. 3350 m., 29 July, 1913, *P. B. Kennedy 4178* (Mo. Bot. Gard. Herb. Nos. 715463, 749546), TYPE; dry rocky hill, Bunker Hill, Toiyabe Forest, alt. 2250–3400 m., 29 July, 1913, *Hitchcock 861* (U. S. Nat. Herb. No. 766173).

Idaho: alpine meadows, mountain top, Lost River Mountains, near Clyde, Blaine Co., alt. 3045 m., 10 July, 1916, *Macbride & Payson 3131* (Mo. Bot. Gard. Herb.).

**108. *S. werneriaefolius*** Gray, Proc. Am. Acad. **19**: 54. 1883; Syn. Fl. N. Am. **12**: 389. 1884, and ed. 2, 1886; Coulter, Manual Rocky Mountain Region, 209. 1885; Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32**: 20. 1902; Rydb. Fl. Colo. 397. 1906; Clements & Clements, Rocky Mountain Flowers, 293. 1914, as *wernerifolius*.

*S. aureus* var. *werneriaefolius* Gray, Proc. Acad. Nat. Sci. Phil. p. 68. 1863; Porter & Coulter, Fl. Colo. 81. 1874.

*S. perennans* Nelson, Bull. Torr. Bot. Club **25**: 549. 1898, and Contr. Fl. Rocky Mountains, 43. 1904; Rydb. Fl. Colo. 397. 1906.

*S. scaposus* Nelson, Bull. Torr. Bot. Club **25**: 379. 1898, not DC.

A low herbaceous perennial, at first white-tomentose, more or less glabrate; stems solitary or several from a multicapital caudex, erect or nearly so, .5 to 2.5 dm. high; leaves chiefly basal, thick or subcoriaceous in texture, linear-spatulate to elliptic-oblongate, 2 to 10 cm. long, 2 to 15 mm. broad, entire or slightly dentate towards the apex, margins usually strongly revolute; inflorescence a terminal one to several-headed corymbose cyme; heads 10 to 12 mm. high, radiate;

involucre campanulate, sparingly calyculate, persistently tomentulose; bracts of the involucre (13–)21, linear-lanceolate, 6 to 8 mm. long; ray-flowers 10 to 12, rays yellow; disk-flowers numerous, 45 to 60; achenes glabrous or rarely slightly hirtellous.

Distribution: foothills and mountains, Wyoming and southwestern South Dakota to Arizona.

Specimens examined:

Wyoming: Laramie Hills, 6 June, 1896, *A. Nelson 1908* (Gray Herb. and Mo. Bot. Gard. Herb.); Battle Lake Mountain, 17 Aug., 1897, *A. Nelson 4216* (Gray Herb. and Mo. Bot. Gard. Herb.); rocky ravine, Laramie Hills, Albany Co., 4 June, 1899, *A. & E. Nelson 6822* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); shaded cañons, Laramie Mountains, Albany Co., June, 1902, *A. Nelson 8832* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); near Laramie, 31 May, 1897, *Osterhout 30* (Greene Herb., Univ. of Notre Dame).

South Dakota: Hot Springs, June, 1893, *Schneck* (Mo. Bot. Gard. Herb.).

Colorado: Lat. 39–41°, coll. of 1862, *Hall & Harbour 331* (Gray Herb., Phil. Acad. Nat. Sci. Herb., Field Mus. Herb., and Mo. Bot. Gard. Herb.), TYPE, erroneously recorded as No. 313 in original publication; Lat. 39–41°, coll. of 1862, *Hall & Harbour 321* (U. S. Nat. Herb. No. 40360); Rocky Mountains, coll. of 1862, *Parry* (Mo. Bot. Gard. Herb.); dry woods of pine and spruce at great elevations, 14 June, 1870, *E. L. Greene 224* (Gray Herb.); Gray's Peak, 30 July, 1872, *Redfield 194* (Mo. Bot. Gard. Herb.); Clear Creek Cañon, alt. 2740 m., Hayden's U. S. Geol. Survey, 15 June, 1873, *J. M. Coulter* (Gray Herb., U. S. Nat. Herb., and Phil. Acad. Nat. Sci. Herb.); Clear Creek, Hayden's U. S. Geol. Survey, 20 May, 1873, *J. M. Coulter* (Phil. Acad. Nat. Sci. Herb.); Georgetown, Wheeler's Expedition, June, 1873, *Wolf & Rothrock 588 [172]* (Gray Herb. and U. S. Nat. Herb. No. 48767); Georgetown, coll. of 1875, *E. L. Greene* (Greene Herb., Univ. of Notre Dame); Georgetown Pass, near Empire, 5 Aug., 1874, *G. Engelmann* (Mo. Bot. Gard. Herb.); high mountains about Gray's Peak, alt. 3050–3655 m., July, 1885, *Patterson*

85 (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); Gray's Peak, alt. 3350–3800 m., 23 July and 15 Aug., 1885, *Letterman* (Mo. Bot. Gard. Herb.); Breckenridge, coll. of 1887, *S. D. Bereman* 750 (Mo. Bot. Gard. Herb.); Cripple Creek, alt. 3050 m., May, 1895, *Tweedy* 356 (U. S. Nat. Herb.); Mount Baldy, alt. 3400 m., 20 June, 1903, *F. E. & E. S. Clements* 298.1 (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); St. Elmo, alt. 3030 m., 2 June, 1910, *Eggleston* 5634 (U. S. Nat. Herb.); on dry hillsides, Tolland, alt. 2740 m., 21 June, 1914, *Overholts* (Mo. Bot. Gard. Herb.).

Utah: cañon above Tropic, alt. 2135 m., 29 May, 1894, *M. E. Jones* 5312<sup>as</sup> (U. S. Nat. Herb. No. 326831).

Arizona: San Francisco Mountains, alt. 2740 m., 25 June, 1891, *MacDougal* 289 (U. S. Nat. Herb.); DeMotte Park, Buckskin Mountains, alt. 2740 m., 19 Sept., 1894, *M. E. Jones* 6056<sup>al</sup> (U. S. Nat. Herb. No. 326830); Humphrey's Peak, San Francisco Mountains, alt. 2740–3655 m., 7–10 Aug., 1898, *MacDougal* 388 (Gray Herb., U. S. Nat. Herb., Phil. Acad. Nat. Sci. Herb., and Univ. Ariz. Herb.); Kendrick Peak, near Flagstaff, June, 1900, *Purpus* 8002 (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); slopes of San Francisco Mountains, alt. 3000 m., 7 July, 1901, *Leiberg* 5661 (U. S. Nat. Herb.), form with both glabrous and slightly hirtellous achenes; San Francisco Mountains, May–Oct., 1902, *Purpus* 26 (Mo. Bot. Gard. Herb.).

Var. *incertus* Greenm. var. nov.

Heads subdiscoïd; outer cycle of flowers 8 to 12, tubular, somewhat smaller than the normal flowers of the disk, their corollas slender, 3–4-toothed, and bearing imperfect stamens.

Distribution: known only from the type locality.

Specimen examined:

Colorado: Georgetown, coll. of 1875, *E. L. Greene* (Gray Herb.), TYPE.

109. **S. Thurberi** Gray, Proc. Acad. Nat. Sci. Phil. p. 68. 1863; Syn. Fl. N. Am. 1<sup>2</sup>: 389. 1884, and ed. 2, 1886; Greenm.

Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902; Wooton & Standley, Contr. U. S. Nat. Herb. **19** : 746. 1915.

*S. canus* var. *pygmaea* Gray, Bot. Mex. Bound. Surv. p. 103. 1859.

A low herbaceous perennial, at first white-tomentose, somewhat glabrate; stems solitary or cespitose, .5 to 1.5 dm. high, slender; leaves chiefly basal, linear or linear-ob lanceolate, 1 to 3 cm. long, 1 to 2 mm. broad, entire or inconspicuously dentate towards the apex, acute or obtusish, slightly revolute-margined; upper stem-leaves few, bract-like; heads solitary or terminating the scapose stem in a few-headed corymbose cyme, 6 to 10 mm. high, radiate; involucre campanulate, sparingly calyculate, glabrous or nearly so; bracts of the involucre (13-)21, linear-lanceolate, 4 to 7 mm. long; ray-flowers 7 to 10, rays yellow; disk-flowers rather numerous; achenes hispidulous.

Distribution: mountains of southwestern New Mexico.

Specimens examined:

New Mexico: hillsides, Copper Mines, Santa Rita del Cobre, May, 1851, *Thurber* 210 (Gray Herb., Kew Herb., Berlin Herb., and Mo. Bot. Gard. Herb.), TYPE, and at the same station, June, 1851, *Bigelow* (Gray Herb.); without definite locality, *Mexican Boundary Survey* 661 (U. S. Nat. Herb. Nos. 47599, 47600).

**110. S. Actinella** Greene, Bull. Torr. Bot. Club **10** : 87. 1883; Gray, Syn. Fl. N. Am. 1<sup>2</sup>: 384. 1884, and ed. 2, 1886; Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902; Wooton & Standley, Contr. U. S. Nat. Herb. **19** : 745. 1915.

A low herbaceous perennial, at first white-tomentose throughout, more or less glabrate; stem 1 to 3 dm. high, rising from a stoutish subhorizontal or ascending rootstock, leafy at the slightly decumbent base, nearly naked above; leaves subcoriaceous, ovate, obovate to oblong-ob lanceolate, rounded to obtuse at the apex, entire to slightly sinuate-dentate, narrowed below into a winged petiole, including the petiole 1.5

to 10 cm. long, .5 to 2.5 cm. broad; heads usually solitary, rarely two, 1.5 to 2 cm. high, radiate; involucre campanulate, calyculate; bracts of the involucre about 21, linear-lanceolate, 10 to 13 mm. long; ray-flowers 9 to 13, rays pale yellow; disk-flowers numerous; achenes pubescent.

Distribution: southwestern United States and northern Mexico.

Specimens examined:

Arizona: Flagstaff, 7 June, 1883, *Rusby 671* (Gray Herb., U. S. Nat. Herb., Phil. Acad. Nat. Sci. Herb., and Mo. Bot. Gard. Herb.), TYPE; without definite locality, coll. of 1869, *E. Palmer* (Kew Herb. and U. S. Nat. Herb.); San Francisco Mountains, Aug., 1884, *Lemmon 3265* (Gray Herb. and U. S. Nat. Herb.); Baker's Butte, 2 June, 1890, *Jones* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); Willow Spring, 10-20 June, 1890, *E. Palmer 488* (Gray Herb., Kew Herb., and U. S. Nat. Herb.); Flagstaff, 3 July, 1892, *Wootton* (U. S. Nat. Herb.); Belmont, 29 June, 1892, *Toumey 600* (Gray Herb.); Belmont, 29 June, 1892, *Toumey 600a* (U. S. Nat. Herb.); San Francisco Mountains, 14 July, 1892, *Toumey 600b* (U. S. Nat. Herb.); vicinity of Flagstaff, alt. 1675 m., 31 May, 1898, *MacDougal 5* (Gray Herb., U. S. Nat. Herb., Phil. Acad. Nat. Sci. Herb., and Univ. Ariz. Herb.); base of San Francisco Mountains, southwest side, 3 June, 1901, *Ward* (U. S. Nat. Herb.); near Flagstaff, alt. 1900 m., coll. of 1901, *Leiberg 5533* (U. S. Nat. Herb.); Fort Valley, Coconino National Forest and vicinity, 14 June, 1909, *Pearson 174* (U. S. Nat. Herb.); open flats, Cooley's Ranch, 1 July, 1912, *Goodding 1104* (U. S. Nat. Herb.).

Chihuahua: near Colonia Garcia in the Sierra Madre, alt. 2285 m., 9 June, 1899, *Townsend & Barber 25* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); vicinity of Madera, alt. about 2250 m., 27 May-3 June, 1908, *E. Palmer 282* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.).

Durango: Quebrada Honda, 20 and 21 May, 1906, *E. Palmer 212* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.), and *218* (Gray Herb. and U. S. Nat. Herb.).

Var. *mogollonicus* (Greene) Greenm. comb. nov.

*S. mogollonicus* Greene, Leaf. Bot. Obs. & Crit. 1:212. 1906; Wooton & Standley, Contr. U. S. Nat. Herb. 19:745. 1915.

Stem 2 to 4.5 dm. high; leaves spatulate-oblongate, 3 to 17 cm. long, .5 to 3.5 cm. broad; heads solitary or not infrequently two.

Distribution: New Mexico to northern Mexico.

Specimens examined:

New Mexico: Mogollon Mountains, on or near the West Fork of the Gila River, Socorro Co., alt. 2285 m., 7 Aug., 1903, *Metcalfe 410* (Greene Herb., Univ. of Notre Dame, U. S. Nat. Herb., and Mo. Bot. Gard. Herb.), TYPE.

Arizona: Flagstaff, 14 May, 1891, *MacDougal 75* (U. S. Nat. Herb.).

Chihuahua: Sierra Madre, 24 Sept., 1887, *Pringle 1537* (Gray Herb.).

The variety has somewhat larger leaves with more attenuated petioles and occasionally bears two heads, but in all essential characters it accords with the species into which it directly passes through several intermediates.

### 111. *S. molinarius* Greenm.<sup>1</sup>

An herbaceous perennial, white-tomentose throughout; stems simple, erect, about 1.5 dm. high from a simple or branched ascending stoutish rootstock, densely lanate at the base, floccose-tomentose above; leaves mostly clustered at the base of the stem, petiolate, subobovate to broadly elliptic, including the petiole 2 to 6 cm. long, .5 to 1.5 cm. broad, entire,

<sup>1</sup> *Senecio molinarius* Greenm. sp. nov., herbaceus perennis; rhizomate crasso ascendente simplici vel ramoso; caule simplici erecto circiter 1.5 dm. alto basi dense lanato superne floccoso-tomentoso; foliis inferioribus petiolatis subobovatis vel ellipticis petiolo incluso 2-6 cm. longis .5-1.5 cm. latis integris ad apicem submucronatis basi in petiolum angustatis subcoriaceis juventate utrinque albotomentosis denique plus minusve glabris, petiolo lamina longiore; foliis superioribus paucis multo reductis bracteiformibus; inflorescentiis terminalibus crebre corymboso-cymosis paucipitibus; capitulis circiter 12 mm. altis radiatis; involucri campanulato calyculato; involucri squamis plerumque 21 lineari-lanceolatis 7-8 mm. longis apice acutis purpurascens albo-marginatis dorso dense tomentulosi; flosculis liguliferis 10-12, ligulis flavibus; floribus disci circiter 60; acheniis hirtellis.—Collected at Pagosa Springs, Colorado, alt. 2130 m., 15 May, 1894, *Benjamin H. Smith* (Phil. Acad. Nat. Sci. Herb., photograph in Mo. Bot. Gard. Herb.), TYPE. Mr. Smith's plant was distributed as "*Senecio canus* Hook.", under which name it may be found in herbaria.

submucronate, narrowed below into a petiole usually exceeding the blade, thick and firm in texture, white-tomentose on both surfaces, somewhat glabrate; inflorescence a few-headed close corymbose cyme; heads about 12 mm. high, radiate; involucre campanulate, calyculate; bracts of the involucre about 21, linear-lanceolate, 7 to 8 mm. long, densely tomentose, whitish-margined and conspicuously tipped with purple; ray-flowers 10 to 12, rays yellow; disk-flowers about 60; achenes hirtellous.

Distribution: known only from the type locality.

Specimen examined:

Colorado: Pagosa Springs, alt. 2130 m., 15 May, 1894, *Benjamin H. Smith* (Phil. Acad. Nat. Sci. Herb.), TYPE.

**112. *S. gerberaefolius*** Schz. Bip. in Hemsl. Biol. Cent.-Am. Bot. 2 : 240. 1881; Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. 32 : 20. 1902.

A low herbaceous perennial; stem erect, scapose, 1 to 3 dm. high from a stout caudex, silky villous at the base, tomentose to nearly glabrous above; leaves mostly radical, subcoriaceous, lanceolate to oblong-lanceolate, including the narrowly winged silky villous petiole 5 to 14 cm. long, 1 to 2 cm. broad, acute or obtuse, entire or obscurely dentate, strongly revolute-margined, at first tomentulose but soon glabrate above, densely and permanently white-tomentose beneath; upper stem-leaves few, bract-like; heads 2 to 6, rather large, 13 to 17 mm. high, radiate; involucre campanulate, calyculate; bracts of the involucre about 13, lanceolate to lance-ovate, 10 to 13 mm. long, 1.5 to 4 mm. broad; ray-flowers about 13, rays yellow; disk-flowers numerous; achenes densely appressed-villous.

Distribution: high mountains of southern Mexico.

Specimens examined:

South Mexico: peak of Orizaba, alt. 3050-4660 m., *Liebmann 140* (Gray Herb.); rocky soil, subalpine region, Mt. Ixtaccihuatl, Oct., 1905, *Purpus 1516* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.).

**113. *S. Greenei*** Gray, Proc. Am. Acad. **10** : 75. 1874; Bot. Calif. **1** : 412. 1876; Syn. Fl. N. Am. **1**<sup>2</sup>: 385. 1884, and ed. 2, 1886; Greene, Manual, Region of San Francisco Bay, 213. 1894; Fl. Franciscana, 472. 1897; Jepson, Fl. West. Mid. Calif. 512. 1901, and ed. 2, 428. 1911; Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902.

An herbaceous perennial, at first lightly floccose-tomentulose, somewhat glabrate; stems 1.5 to 4 dm. high, erect or nearly so; lower leaves ovate, rarely lanceolate, including the petiole 3 to 12 cm. long, 1 to 6 cm. broad, rounded to acute at the apex, dentate to subentire, abruptly contracted to gradually narrowed at the base into the petiole, equalling or much exceeding the blade, rather thin in texture; upper stem-leaves few, much reduced, bract-like; heads few, 1 to 3, large, 1.5 to 2 cm. high; involucre campanulate, sparingly calyculate; bracts of the involucre about 21, linear-lanceolate, 10 to 13 mm. long; ray-flowers about 12, narrowly oblong, 12 to 20 mm. long, deep orange; disk-flowers numerous; achenes glabrous.

Distribution: Coast Range of northern California.

Specimens examined:

California: mountain side, near the Geysers, Lake Co., 17 June, 1874, *Greene 305* (Gray Herb.), TYPE; Lake Co., coll. of 1884, *Curran* (Kew Herb. and Phil. Acad. Nat. Sci. Herb.); Mt. St. Helena, 13 June, 1894, *E. L. Greene* (Greene Herb., Univ. of Notre Dame); between Mud Flats and Bennet Spring on the Newville-Covelo road in the Coast Range, Glenn Co., *Heller 11930* (Mo. Bot. Gard. Herb.); Sanhedrin Mountain, Mendocino Co., June, 1884, *Rattan 28* (Gray Herb. and Kew Herb.), form with lanceolate lower stem-leaves.

**114. *S. convallium*** Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902; Ann. Mo. Bot. Gard. **1** : 266. 1914.

An herbaceous perennial, subappressed-sericeous-pubescent; stems one to several from a common base, erect, 1.5 to 3 dm. high; basal and lower stem-leaves petiolate, elliptic-lanceolate to oblong-ob lanceolate, including the petiole 2.5 to 6 cm. long, 5 to 12 mm. broad, entire or slightly dentate



towards the apex, subappressed-sericeous on both surfaces, somewhat glabrate above; upper stem-leaves much reduced, oblanceolate to linear, entire and bracteiform; inflorescence a few-headed corymbose cyme; heads about 1 cm. high, radiate; involucre campanulate, sparingly calyculate; bracts of the involucre about 13, linear-attenuate, 7 to 9 mm. long, acute, slightly sericeous-tomentulose; ray-flowers 8 to 10, rays yellow; disk-flowers 30 to 35; achenes glabrous.

Distribution: northern Utah.

Specimens examined:

Utah: Rabbit Valley, alt. 2130 m., U. S. Geol. and Geog. Survey of the Territories, Aug., 1875, *L. F. Ward 704* (Gray Herb., U. S. Nat. Herb., and Phil. Acad. Nat. Sci. Herb.), TYPE.

**115. *S. Leonardii* Rydb. Bull. Torr. Bot. Club 37: 468. 1910.**

*S. aureus* var. *obovatus* Wats. Bot. King's Exp. 190. 1871, in part, i. e. as to Watson's Nos. 669, 668.

An herbaceous perennial, at first lightly floccose-tomentulose throughout, later more or less glabrate; stems erect, 3 to 7.5 dm. high, simple or branched, striate; basal and lower stem-leaves long-petiolate, ovate to obovate or oblong-oblanceolate, including the petiole 4 to 18 cm. long, 1 to 3 cm. broad, rounded to obtuse at the apex, crenate-dentate to rather sharply serrate, narrowed below into the petiole which usually much exceeds the blade, rather thickish in texture, lightly floccose-tomentulose on both surfaces in the early stages but soon more or less glabrate especially on the upper surface; uppermost stem-leaves sessile, oblanceolate to lanceolate, dentate to laciniate-pinnatifid, often semiamplexicaul by an expanded coarsely toothed base; inflorescence a terminal several to many-headed corymbose cyme; heads 8 to 10 mm. high, radiate; involucre campanulate, calyculate, floccose-tomentulose, especially at the base, to essentially glabrous; ray-flowers 10 to 13, rays yellow; disk-flowers rather numerous, 50 to 75; achenes glabrous.

Distribution: British Columbia, south to Utah and Nevada.

Specimens examined:

British Columbia: Burgess Trail, vicinity of Field, alt. 1520–1825 m., 16 July, 1906, *Stewardson Brown 510* (Phil. Acad. Nat. Sci. Herb.); Emerald Lake, Yoho Valley, 27 Aug., 1904, *Macoun* (Gray Herb. and Geol. Surv. Canada Herb. No. 65015).

Oregon: near top of Hasbrook Gulch, alt. 1520 m., 15 July, 1897, *Sheldon 8570* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.).

Utah: Wasatch Mountains, alt. 2130 m., June, 1869, *Watson 669* (U. S. Nat. Herb.); Alta, Wasatch Mountains, alt. 3350 m., 31 July, 1879, *Jones 1125* (Berlin Herb., fragment and tracing in Gray Herb.); Salt Lake City, alt. 1310 m., 15 July, 1880, *Jones 1996* (U. S. Nat. Herb. and Univ. Chicago Herb. at Field Mus. No. 252611); near divide, head of American Fork Cañon, 29 July, 1885, *Leonard 143* (N. Y. Bot. Gard. Herb.), TYPE; near Midway, Wasatch Co., 6 July, 1905, *Carlton & Garrett 6701* (U. S. Nat. Herb.).

Nevada: East Humboldt Mountains, alt. 2740 m., Aug., 1868, *Watson 668* (Gray Herb.).

This species has many characters in common with the section *Aurei*, but on account of the more or less persistent white tomentum on the stem, in the inflorescence, and on the leaf-surface it is placed rather in the section *Tomentosi*.

**116. *S. tomentosus* Michx.** Fl. Bor. Am. 2 : 119. 1803; Ell. Sk. 2 : 329. 1824; Torr. & Gray, Fl. N. Am. 2 : 443. 1843, excl. var.  $\beta$ .; DC. Prodr. 6 : 433. 1837, mainly; Gray, Syn. Fl. N. Am. 1<sup>2</sup>: 390. 1884, and ed. 2, 1886; Chapman, Fl. Southern U. S. 245. 1860, and ed. 2, 1889; *ibid.* ed. 3, 266. 1897; Britton & Brown, Ill. Fl. 3 : 477, fig. 4038. 1898, and ed. 2, 543, fig. 4622. 1913; Bergen, Fl. Northern and Central States, 232. 1901; Britton, Manual, 1026. 1901, and ed. 2, 1905; Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. 32 : 20. 1902; Small, Fl. Southeastern U. S. 1304. 1903, and ed. 2, 1913; Greenm. in Gray's Manual, ed. 7, 855. 1908.

*Cineraria integrifolia*  $\beta$ . *minor* Pursh, Fl. Am. Sept. 2 : 528. 1814, and ed. 2, 1816, in synonymy and as to Carolina plant.

*S. Alabamensis* Britton in Small, Fl. Southeastern U. S. 1305. 1903, and ed. 2, 1913.

An herbaceous perennial, more or less densely woolly-tomentose; stems erect, 2 to 6 dm. high, simple or branched; radical and lower stem-leaves petiolate, oblong-ovate to oblong-lanceolate, including the petiole 5 to 40 cm. long, 1 to 7 cm. broad, occasionally sublyrate, rounded to acute at the apex, subentire, crenate to somewhat serrate-dentate, cuneate to subcordate at the base, at first densely white-tomentose on both surfaces, later more or less glabrate; petioles sometimes much exceeding the blade; upper stem-leaves variable, sessile, oblong-lanceolate to linear-lanceolate, subpinnate to entire; inflorescence a terminal few to many-headed corymbose cyme; heads 10 to 12 mm. high, radiate; involucre campanulate, sparingly calyculate, tomentose to glabrous; bracts of the involucre about 21, linear-lanceolate, 6 to 7 mm. long; ray-flowers about 13, rays yellow; disk-flowers 50 to 60; achenes hispidulous.

Distribution: southern New Jersey to Florida, west to Arkansas and Texas.

Specimens examined:

New Jersey: West Creek, Ocean Co., 22 July, 1907, *Long* (Phil. Acad. Nat. Sci. Herb.); Egg Harbor, Atlantic Co., 1 May, 1900, *Williamson* (C. S. Williamson Herb.); Landisville, *Gross* (Gray Herb. and Phil. Acad. Nat. Sci. Herb.); Dias Creek, 11 Aug., 1909, *Long*, Green Creek, 15 Aug., 1909, *Van Pelt*, Cold Spring, 27 May, 1906, *H. A. Lang*, Cold Spring, 1 June, 1911, *O. H. Brown*, 7 June and 13 Aug., 1907, *Van Pelt*, between Cape May and Cold Spring, 27 May, 1906, *Van Pelt*, Cape May, 31 May, 1885, *Isaac Burk*, Cape May, 15 June, 1892, *Joseph Crawford*, Cape May, 1 June, 1902, *W. Stone*, Cape May Court House, 1 June, 1912, *Williamson*, border of marsh, Cape May, 3 April, 1909, *Long*, Cape May Point, 27 May, 1906, *Van Pelt* (Phil. Acad. Nat. Sci. Herb.).

Delaware: Deakyneville, 27 July, 1891, *Commons* (Phil. Acad. Nat. Sci. Herb.); Ellendale, without date, *Williamson* (C. S. Williamson Herb.); Georgetown, 4 July, 1908, *William-*

*son* (Phil. Acad. Nat. Sci. Herb.); Gumboro, 4 Aug., 1874, *Commons* (Phil. Acad. Nat. Sci. Herb.); Frankford, 18 June, 1875, *Commons* (Phil. Acad. Nat. Sci. Herb.); sandy swamp, Millsboro, 23 May, 1876, *Commons* (Phil. Acad. Nat. Sci. Herb. and Mo. Bot. Gard. Herb.); Laurel, 16 June, 1893, and 30 May, 1895, *Commons* (Phil. Acad. Nat. Sci. Herb.); sandy soil, south Delaware, Aug., 1878, *Canby* (Phil. Acad. Nat. Sci. Herb.).

Maryland: Newhope, Wicomico Co., 10 May, 1905, *A. Hames 532* (U. S. Nat. Herb.); Berlin, Worcester Co., May, 1868, *Canby* (Mo. Bot. Gard. Herb.); without definite locality, *Pickering* (Phil. Acad. Nat. Sci. Herb.).

Virginia: low ground, Hampton, Elizabeth City Co., 13 May, 1877, *Ward* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); dry open field, Hampton, 19 May, 1903, *Miller* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); open field, Hampton, 26 April, 1913, *Standley & Bollman 9959* (U. S. Nat. Herb.); near Virginia Beach, Princess Co., 29 April, 1898, *Coville & Kearney 26* (U. S. Nat. Herb.); Norfolk, Norfolk Co., coll. of 1870, *J. McMinn* (U. S. Nat. Herb.); Norfolk, 15 May, 1872, *A. H. Curtiss* (Mo. Bot. Gard. Herb.); vicinity of Norfolk, coll. of 1907, *Jensen* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); Norfolk, without date, *Dana* (Gray Herb.); Northwest, Norfolk Co., 23 May, 1893, *Heller 850* (U. S. Nat. Herb. and Phil. Acad. Nat. Sci. Herb.); dry open ground, borders of Dismal Swamp, 15 May, 1877, *Morong* (Mo. Bot. Gard. Herb.); Dismal Swamp, coll. of 1877, *Chickering* (U. S. Nat. Herb.); Dismal Swamp, coll. of 1873, *W. H. Seaman* (U. S. Nat. Herb.); Suffolk, Nansemond Co., 8–13 June, 1893, *Heller 850* (Mo. Bot. Gard. Herb.); near Suffolk, 30 April, 1898, *Coville & Kearney 46* (U. S. Nat. Herb.); near Franklin, Isle of Wight Co., 7–28 June, 1893, *Heller 850* (Gray Herb.); near Branchville, Southampton Co., 12 June, 1893, *Heller 958* (U. S. Nat. Herb.).

North Carolina: Weldon, Halifax Co., colls. of 1892, 1897, and 1908, *Williamson* (Phil. Acad. Nat. Sci. Herb. and C. S. Williamson Herb.); without definite locality, *M. A. Curtis* (Mo. Bot. Gard. Herb.); Caesar's Head, 3 Sept., 1876, *Engelmann* (Mo. Bot. Gard. Herb.).

South Carolina: foot of Caesar's Head, coll. of 1876, *A. Gray* (Gray Herb.); Table Rock, *Buckley* (Gray Herb.); mountains of Carolina, coll. of 1843-44, *Buckley* (Gray Herb. and Phil. Acad. Nat. Sci. Herb.).

Georgia: Stone Mountain, May, 1883, *Engelmann* (Mo. Bot. Gard. Herb.); lower slopes of Stone Mountain, alt. 300-375 m., 17 April, 1893, *Small* (Phil. Acad. Nat. Sci. Herb. and Mo. Bot. Gard. Herb.); Stone Mountain, 14 May, 1897, *Biltmore Herb. 3134a* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); Stone Mountain, 20 and 23 May, 1897, *Eggert* (Mo. Bot. Gard. Herb.); base of Stone Mountain, 11 April, 1901, *Biltmore Herb. 3134b* (C. C. Deam Herb.); lower slopes of Stone Mountain, 6 May, 1901, *A. H. Curtiss 6769* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); "Vidalia," April, 1914, *A. M. Huger* (Mo. Bot. Gard. Herb.).

Florida: damp pine barrens, without definite locality, *A. W. Chapman* (Gray Herb., Kew Herb., U. S. Nat. Herb., Phil. Acad. Nat. Sci. Herb., and Mo. Bot. Gard. Herb.).

Louisiana: banks of Red River, near Alexandria, *Hale* (U. S. Nat. Herb. and Kew Herb.).

Arkansas: without definite locality, *Nuttall* (Phil. Acad. Nat. Sci. Herb.); on prairie, Prescott, 8 April, 1900, *Bush 528* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); Fulton, 30 April, 1905, *Bush 2519* (Mo. Bot. Gard. Herb.); low wet woods, Texarkana, 8 April, 1905, *Bush 2255* (Mo. Bot. Gard. Herb.).

**117. *S. antennariifolius*** Britton in Britton & Brown, Ill. Fl. 3 : 478, fig. 4040. 1898, and in ed. 2, 542, fig. 4620. 1913; Britton, Manual, 1027. 1901, and ed. 2, 1905; Greenm. Monogr. Senecio, I. Teil, 24. 1901, in Engl. Bot. Jahrb. 32 : 20. 1902, and in Gray's Manual, ed. 7, 855. 1908.

*S. tomentosus* var.  $\beta$ . Torr. & Gray, Fl. N. Am. 2 : 443. 1843.

*Cineraria heterophylla* Pursh, Fl. Am. Sept. 2 : 528. 1814, and ed. 2, 1816.

*Senecio integrifolius*  $\beta$ . *heterophylla* Nutt. Gen. 2 : 165. 1818.

An herbaceous perennial, more or less white-tomentose throughout; stems 2.5 to 4 dm. high; leaves mostly basal, oblong-obovate to spatulate, including the petiole 3 to 6 cm. long, .5 to 2 cm. broad, rounded or obtuse at the apex, entire to remotely and shallowly dentate, narrowed below the middle into the petiole, finely and densely matted white-tomentose beneath, loosely floccose-tomentose and somewhat glabrate above; stem-leaves sublyrate to merely dentate, the uppermost reduced to linear bracts; inflorescence a few to several-headed corymbose cyme; heads about 1 cm. high, radiate; involucre campanulate, calyculate, tomentulose; bracts of the involucre 18 to 21; ray-flowers 10 to 12, rays yellow; disk-flowers about 40; achenes hirtellous.

Distribution: mountains of Virginia.

Specimens examined:

Virginia: Blue Ridge, *Buckley* (Gray Herb.); Massanutton Mountains, Page Co., 13 May, 1900, *G. S. Miller* (U. S. Nat. Herb.); Hot Springs, 17 April, 1903, *C. F. Batchelder* (Walter Deane Herb., photograph in Field Mus. Herb. and in Mo. Bot. Gard. Herb.); Natural Bridge, 31 May, 1909, *Bartram & Long* (C. S. Williamson Herb.).

**118. *S. canus* Hook.** Fl. Bor. Am. **1** : 333, *pl. 116*. 1834; DC. Prodr. **6** : 433. 1837; Torr. & Gray, Fl. N. Am. **2** : 443. 1843, in part; Gray, Syn. Fl. N. Am. **1**<sup>2</sup>: 390. 1884, and ed. 2, 1886, in part; Macoun, Cat. Canadian Pl. 266. 1884, and ed. 2, 555. 1886, in part; Coulter, Manual Rocky Mountain Region, 210. 1885, in part; Rydb. Contr. U. S. Nat. Herb. **3** : 510. 1896, and Mem. N. Y. Bot. Gard. **1** : 444. 1900, in part; Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902; Nelson in Coulter & Nelson, Manual Cent. Rocky Mountains, 580. 1909, in part (excl. synonymy); Fl. Intermountain States, 175. 1912, in part.

*S. integrifolius* Nutt. Gen. **2** : 165. 1818, in part.

*S. Purshianus* Nutt. Trans. Am. Phil. Soc. N. S. **7** : 412. 1841, in part, i. e. as to plant from "banks of the Missouri."

*S. Purshianus* var. *viridescens* Lunell, Am. Mid. Nat. **1** : 207. 1910.

*S. canus* var. *acraeus* Greenm. Ottawa Nat. **25** : 118. 1911.

*S. canus* var. *celsus* Sharp, Bot. Gaz. **61** : 46. 1916.

*Cineraria integrifolia*  $\beta$ . *minor* Pursh, Fl. Am. Sept. **2** : 528. 1814, and ed. 2, 1816, in part (excl. syn.), i. e. as to plant from "banks of the Missouri."

A caespitose herbaceous perennial, white-tomentose throughout, occasionally somewhat glabrate especially on the upper leaf-surface; stems erect or nearly so, simple or branched, usually about 3 dm. high (varying from 1.2 to 5 dm.); radical and lower stem-leaves oblong-obovate to oblanceolate, 2 to 12 cm. long, .5 to 2.5 cm. broad, rounded to obtuse at the apex, entire or somewhat dentate, usually persistently white-tomentose on both surfaces, occasionally more or less glabrate above, narrowed below the middle into a petiole about equalling or shorter than the blade; upper stem-leaves sessile, lanceolate to linear, entire to coarsely dentate, often amplified and lacinate at the more or less amplexicaul base; inflorescence a terminal few to several-headed corymbose cyme; heads 10 to 12 mm. high, radiate or rarely discoid; involucre campanulate, sparingly calyculate, tomentose to nearly glabrous; bracts of the involucre usually about 21, occasionally fewer, linear-lanceolate, 6 to 8 mm. long; ray-flowers 8 to 12, rays yellow; disk-flowers commonly 40 to 70; achenes glabrous (notwithstanding original illustration).

Distribution: Manitoba to Nebraska, west to British Columbia and Colorado.

Specimens examined:

Dominion of Canada: "banks of the Saskatchewan," *Drummond* (Gray Herb. and Geol. Surv. Canada Herb.), co-TYPE; Carlton House, *Richardson* (Geol. Surv. Canada Herb.); Palliser's Brit. N. Am. Expl. Exp., coll. of 1858, *Bourgeau* (Gray Herb.).

Manitoba: near Forest, 19 July, 1906, *Macoun* (Mo. Bot. Gard. Herb. and Geol. Surv. Canada Herb.).

Saskatchewan: Moose Mountains, July, 1880, and 4 July, 1883, *Macoun* (U. S. Nat. Herb. Nos. 219789, 143119); Assiniboine Rapids, 14 June, 1879, *Macoun* 49 (Gray Herb.); Spy Hill, 23 June, 1879, *Macoun* 52 (Gray Herb.), type of variety

*acraeus*, which, however, in a large series of specimens merges imperceptibly into the species; sand hills, along the Shell River, north of Prince Albert, 13 July, 1876, *Macoun* (Geol. Surv. Canada Herb. No. 12170); prairies, The Holes, Wood Mountain, 19 July, 1895, *Macoun* (Geol. Surv. Canada Herb. No. 11617); Frenchman's Creek, Cypress Hills, 22 June, 1895, *Macoun* (Geol. Surv. Canada Herb. No. 11618); on the dry side of a coulee, north of Moose Jaw, 22 June, 1896, *Macoun* (Geol. Surv. Canada Herb. No. 12789); on dry gravelly soil, near Moose Mountain Creek, 6 June, 1883, *Macoun* (Geol. Surv. Canada Herb. No. 14834), both radiate and discoid heads.

Alberta: on gravel, Police Point, Medicine Hat, 4 June, 1894, *Macoun* 5069 (Gray Herb. and Geol. Surv. Canada Herb.); dry cliffs, Lethbridge, 5 June, 1894, *Macoun* 5085 (Gray Herb., U. S. Nat. Herb., and Geol. Surv. Canada Herb.); Milk River, 8 July, 1881, *Dawson* (Geol. Surv. Canada Herb. No. 26687); dry slopes, Canmore, 29 June, 1885, *Macoun* (Geol. Surv. Canada Herb. No. 14827); on gravel along the railway, Calgary, 7 June, 1897, *Macoun* (Geol. Surv. Canada Herb. No. 23105); on the road around the Loop, near Banff, 28 June, 1899, *Dawson* (Geol. Surv. Canada Herb. No. 22317); on rocky slopes, Crow's Nest Pass, 5 Aug., 1897, *Macoun* (Geol. Surv. Canada Herb. No. 22789); dry gravelly slopes, Bow River at Morley, 6 Sept., 1879, *Macoun* (Geol. Surv. Canada Herb. No. 14833); near Banff, 26 June, 1891, *Macoun* (Gray Herb. and Mo. Bot. Gard. Herb.); near Banff, 25 July, 1895, *ex Herb. Canby* (Gray Herb. and U. S. Nat. Herb. No. 233908); gravelly and sandy slopes and plains, vicinity of Banff, alt. 1370 m., 28 June, 1899, *McCalla* 2047 (U. S. Nat. Herb.); Banff, 4 Sept., 1903, also 3 and 14 June, 1904, *Farr* (Univ. Penn. Herb.); Bow River Valley, alt. 1370 m., 9–18 June, 1906, *Stewardson Brown* 79 (Phil. Acad. Nat. Sci. Herb.); on the Brazeau River, 16 Sept., 1907, *Mrs. Chas. Schaffer* (Phil. Acad. Nat. Sci. Herb.); roadside, Banff, alt. 1340 m., 6 July, 1907, *Butters & Holway* 53 (U. S. Nat. Herb.); Banff, 24 June, 1907, *Cowles* 85 (Mo. Bot. Gard. Herb.); dry soil, Bow Valley west of Calgary, 7



June, 1913, *Moodie* (U. S. Nat. Herb.); dry grassy hills, vicinity of Rosedale, alt. 670–760 m., 28 May, 1915, *Moodie 917* (Mo. Bot. Gard. Herb.).

British Columbia: dry hillsides, Spences Bridge, Thompson River, 20 May, 1875, *Macoun* (Geol. Surv. Canada Herb. No. 14836); in dry gravelly soil, Milk River Ridge (Fossil Coulee), 22 June, 1883, *Dawson* (Geol. Surv. Canada Herb. No. 14835); dry slopes, Spences Bridge, 1 June, 1885, *Fletcher* (Geol. Surv. Canada Herb. No. 14830); dry slopes, Spences Bridge, 26 May, 1889, *Macoun* (Geol. Surv. Canada Herb. No. 14831); Canoe River, head-waters of Columbia River, 31 Aug., 1898, *Spreadborough* (Geol. Surv. Canada Herb. No. 19729); mountains at Kicking Horse Lake, alt. 1825 m., 12 Aug., and Kicking Horse River, alt. 1220 m., 13 Aug., 1890, *Macoun* (Gray Herb. and Geol. Surv. Canada Herb.); Burgess Trail, alt. 1525–1825 m., 16 July, 1906, *Stewardson Brown 512* (Phil. Acad. Nat. Sci. Herb.); Emerald Lake, Yoho Valley, 27 Aug., 1904, and Burgess Pass, Yoho Valley, alt. 2285 m., 28 Aug., 1904, *Macoun* (Gray Herb. and Geol. Surv. Canada Herb. Nos. 65010, 65009), reduced forms.

North Dakota: prairies near Leeds, 10 June, 1901, *Dr. J. Lunell* (C. S. Williamson Herb. and C. C. Deam Herb.); sunny hillsides, Butte, Benson Co., colls. of June, 1906, 1907, 1908, 1909, and July, 1909, *Dr. J. Lunell* (Greene Herb., Univ. of Notre Dame, Mo. Bot. Gard. Herb., and C. C. Deam Herb.); Minot, Ward Co., 6 June and 1 July, 1909, *Dr. J. Lunell* (Mo. Bot. Gard. Herb.); on prairies, Leeds, 10 June, 1902, and 5 July, 1907, *Dr. J. Lunell* (C. C. Deam Herb.), form with discoid heads; Butte, Benson Co., 10 July, 1909, *Dr. J. Lunell* (Mo. Bot. Gard. Herb.), form with discoid heads.

South Dakota: Black Hills, near Fort Meade, 16 May, 1887, *Forwood 229* (U. S. Nat. Herb.); Lead City, alt. 1525–1980 m., 4 July, 1892, *Rydberg 829, 830* (U. S. Nat. Herb.); Brookings, 31 July, 1908, *O. E. White* (Mo. Bot. Gard. Herb.); rocky hillsides, Deadwood, 19 July, 1913, *Rydberg 71* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); Rapid Cañon, Pennington Co., 27 June, 1914, *W. H. Over 1667* (U. S. Nat. Herb.).

Nebraska: arid hills, Fort Union, July, 1853–1854, *Hayden* (Mo. Bot. Gard. Herb.); Bad Lands, coll. of 1853–1854, *Hayden* (Phil. Acad. Nat. Sci. Herb.); Eaglenest Butte, May, 1855, *Hayden* (Mo. Bot. Gard. Herb.); Scottsbluff, 24 July, 1891, *Rydberg 210* (U. S. Nat. Herb.).

“Banks of the Missouri”: *M. Lewis*<sup>1</sup> (Phil. Acad. Nat. Sci. Herb.).

“Upper Louisiana”: *Nuttall* (Phil. Acad. Nat. Sci. Herb.), form with discoid heads.

Montana: Mt. Helena, Helena, 30 June, 1883, *Canby 38*; and mountains near Bozeman, 4 July, 1883, *Canby 37* (Gray Herb.); Belt Creek, June, 1883, *F. W. Anderson 544* (U. S. Nat. Herb.); Great Falls, 13 July, 1885, *F. W. Anderson 780* (U. S. Nat. Herb.); Black Eagle Falls, Aug., 1889, *R. S. Williams* (Mont. Agr. Coll. Herb.); Park Co., coll. of 1889, *Tweedy* (U. S. Nat. Herb. No. 49284); near Butte, alt. 1675–1825 m., Aug., 1893, *Mrs. C. H. Moore* (Mo. Bot. Gard. Herb.); Anaconda, 7 July, and Granite, 14 July, 1892, *F. D. Kelsey* (Mont. Agr. Coll. Herb.); Little Belt Mountains, alt. 1830 m., 18 Aug., 1896, *J. H. Flodman 907* (Mo. Bot. Gard. Herb. and U. S. Nat. Herb.); Columbia Falls, 10 July, 1895, *R. S. Williams* (Mont. Agr. Coll. Herb.); cañons, Bozeman, 27 June, 1898, *Blankinship* (Gray Herb.); Kennedy Creek, 15 July, 1901, *Stuart Weller* (U. S. Nat. Herb. No. 411699); Deer Lodge, 15 July, 1901, *Mrs. E. W. Schubert 34* (Mont. Agr. Coll. Herb.); Midvale, 13 July, 1903, *Umbach 352, 359* (U. S. Nat. Herb.); Empire, June, 1902, *Owen Burns 147* (Mont. Agr. Coll. Herb.).

(?) Yellowstone National Park: “Yellowstone Exp.,” 1873, *Allen* (U. S. Nat. Herb. No. 49282).

Wyoming: top of Bear Peak, 11 July, 1859, Big Horn Mountains, Aug., 1859, and Wind River Valley, 22 May, 1860, Reynolds’ Exp. to the head-waters of the Missouri and Yellowstone Rivers, *Hayden* (Mo. Bot. Gard. Herb.); dry sandy soil, North Fork of Wind River, 15 July, 1882, *Forwood* (Gray Herb. and U. S. Nat. Herb. No. 317134); Wind River Crossings, 15 Aug., 1894, *A. Nelson 761* (Gray Herb. and U. S. Nat.

<sup>1</sup> See footnote under *Senecio Purshianus* Nutt.

Herb.); Pole Creek, 29 June, 1895, *A. Nelson 1364* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); Green River, 1 June, 1897, *A. Nelson 3070* (Mont. Agr. Coll. Herb.); dry slopes, Seminole Mountains, Carbon Co., 21 July, 1898, *A. Nelson 4918* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); Big Horn Mountains, alt. 2435 m., 1 Aug., 1898, *T. A. Williams* (U. S. Nat. Herb. No. 519669); Big Horn Mountains, Aug., 1898, *D. Griffiths* (Mo. Bot. Gard. Herb.); Shoshone Mountains, Aug., 1904, *H. Hapeman* (C. C. Deam Herb.).

Colorado: Cherokee Park, near Wyoming boundary line, 30 July, 1917, *Johnston & Hedgcock 160* (Mo. Bot. Gard. Herb.); high mountains, Gray's Peak and vicinity, July, 1885, *Patterson 80* in part (Gray Herb.).

**119. *S. Harbourii*** Rydb. Bull. Torr. Bot. Club **33**: 158. 1906; Fl. Colo. 396. 1906; Daniels, Univ. Mo. Studies, Sci. Ser. **2**: 399 [251]. 1911.

*S. canus* Porter & Coulter, Syn. Fl. Colo. 82. 1874, not Hook.; Coulter, Manual Rocky Mountain Region, 210. 1885, in part, not Hook.; Nelson in Coulter & Nelson, Manual Cent. Rocky Mountains, 580. 1909, in part, not Hook.

*S. canus* var. *Rothrock*, Bot. Wheeler Exp. 177. 1878, not *S. canus* Hook.

*S. Rothrockii* Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32**: 20. 1902.

A low caespitose herbaceous perennial, lightly floccose-tomentose throughout; stems ascending or suberect, 1 to 2.5 dm. high, simple or branched, usually leafy; basal and lower stem-leaves oblong-ob lanceolate to narrowly oblanceolate, including the petiole 2 to 13 cm. long, 3 to 15 mm. broad, rounded to obtuse at the apex, entire or crenate-undulate, at first lightly floccose-tomentose on both surfaces, later somewhat glabrate, rather abruptly narrowed to gradually attenuated into a narrowly winged petiole, margins more or less revolute; upper stem-leaves usually conspicuous, lanceolate-ligulate and sessile by a more or less amplified entire or dentate auriculate half-clasping base; inflorescence a terminal subcorymbose cyme; heads 10 to 12 mm. high, radiate; involucre campanu-

late, sparingly calyculate, floccose-tomentulose to rarely glabrous; bracts of the involucre about 13, lanceolate, 7 to 10 mm. long; ray-flowers about 8, rays narrowly oblong, 10 to 12 mm. long, conspicuous; disk-flowers 30 to 40; achenes glabrous, 3 to 3.5 mm. long.

Distribution: mountains of Colorado.

Specimens examined:

Colorado: mountains south of Ward, Boulder Co., 18 July, 1901, *Osterhout 2424* (Phil. Acad. Nat. Sci. Herb.), co-type; head-waters of Clear Creek and the alpine ridges lying east of "Middle Park," coll. of 1861, *Parry 20* (Gray Herb., Phil. Acad. Nat. Sci. Herb., and Mo. Bot. Gard. Herb.); Lat. 39–41°, coll. of 1862, *Hall & Harbour 330* (Gray Herb., Phil. Acad. Nat. Sci. Herb., and Mo. Bot. Gard. Herb.); Mt. Parry, coll. of 1872, *Gray* (Gray Herb.); Union Pass, Wheeler's Exp., 1873, *Wolf & Rothrock 559* (Gray Herb. and U. S. Nat. Herb.); Mosquito Pass, Wheeler's Exp., 1873, *Wolf & Rothrock 585* (Gray Herb. and U. S. Nat. Herb.), type of *S. Rothrockii*; spur of Mt. Princeton, Aug., 1880, *Brandeggee* (Mo. Bot. Gard. Herb.); alpine slopes above Berthoud's Pass, 22 July, 1881, *Engelmann* (Mo. Bot. Gard. Herb.); high mountains, Gray's Peak and vicinity, alt. 3350–4260 m., July, 1885, *Patterson 80* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.).

In some of the more reduced alpine forms this species resembles very closely *S. Purshianus*, but usually *S. Harbourii* is readily distinguished from that species by the leafy stem, larger heads, and longer involucral bracts and ray-flowers.

**120. *S. Purshianus* Nutt.<sup>1</sup>** Trans. Am. Phil. Soc. N. S. 7 : 412. 1841, in part, as to plant of Rocky Mountains; Greene,

<sup>1</sup>In the original publication of this species Nuttall states: "HAB. Rocky Mountains (banks of the Platte) also banks of the Missouri." It is to be assumed, therefore, that two collections are involved. In the Gray Herbarium of Harvard University there are two specimens, one labelled in Nuttall's handwriting "*Senecio \*Purshii, Cineraria integrifolia* Ph. non Willd., R. Mts.," the other "*S. purshianus*, Nutt! Rky. Mts. & Platte, Nutt!" These two specimens are clearly identical and are taken by the writer to be the historical type of *Senecio Purshianus* Nutt. In the Herbarium of the Philadelphia Academy of Natural Sciences there is also a specimen which Nuttall included in his species, since its label bears the following annotation in Nuttall's handwriting: "*\*Purshiana* N. (Nutt.)." The data originally recorded on the label is "*Senecio integrifolia?*, *Cineraria* Ph. etc. Missouri." As to this handwriting, I am not cer-

Pittonia 4: 111. 1900; Rydb. Mem. N. Y. Bot. Gard. 1: 445. 1900; Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. 32: 20. 1902; Rydb. Fl. Colo. 395. 1906; Daniels, Univ. Mo. Studies, Sci. Ser. 2: 399 [251]. 1911.

*S. canus* Torr. & Gray, Fl. N. Am. 2: 443. 1843, in part, not Hook.; Gray, Syn. Fl. N. Am. 1<sup>2</sup>: 390. 1884, and ed. 2, 1886, in part, not Hook.; Rydb. Contr. U. S. Nat. Herb. 3: 510. 1896, in part, not Hook., i. e. as to No. 831.

*S. Laramiensis* Nelson, Bull. Torr. Bot. Club 26: 483. 1899.

*S. collinus* Nelson, in Herb.

*S. canus Purshianus* Nelson in Coulter & Nelson, Manual Cent. Rocky Mountains, 581. 1909; Fl. Intermountain States, 175. 1912.

A low caespitose herbaceous perennial, white-tomentose throughout, rarely glabrate; stems usually 1 to 2 dm., rarely 3, high, simple or branched; basal and lower stem-leaves mostly narrowly oblanceolate, occasionally oblong-obovate, including the petiole 2 to 12 cm. long, 3 to 15 mm. broad, rounded to obtuse at the apex, densely tomentose on both surfaces, occasionally somewhat glabrate; upper stem-leaves similar, lanceolate to linear, sessile, entire or somewhat dentate, often amplified into a lobed or semiamplexicaul base; inflorescence a terminal few to several-headed close or open cyme; heads 8 to 10 mm. high, radiate; involucre campanulate, sparingly calyculate, tomentulose to essentially glabrous; bracts of the involucre usually 13, occasionally fewer, linear-lanceolate, 5 to 7 mm. long; ray-flowers about 8, rays yellow; disk-flowers commonly 30 to 45; achenes glabrous.

Distribution: South Dakota and northwestern Nebraska, west to Montana and Colorado.

tain, but it may very well be that of Pursh. However, the plant is doubtless the specimen to which Nuttall referred, as "banks of the Missouri"; furthermore, in all probability it is the plant cited by Pursh (Flora Americae Septentrionalis 2: 528. 1814, and ed. 2, 1816), under *Cineraria integrifolia*  $\beta$ . *minor*, as "on banks of the Missouri, *M. Lewis*." This specimen differs from Nuttall's Rocky Mountain specimens above mentioned in being somewhat taller, in having broader leaves, larger heads, longer and more numerous involucral bracts; it is unquestionably *Senecio canus* Hook.

## Specimens examined:

Rocky Mountains: without definite locality, *Nuttall* (Gray Herb.), TYPE; "Rky. Mts. & Platte," *Nuttall* (Gray Herb.).

South Dakota: Hot Springs, alt. 1065 m., 13 June, 1892, *Rydberg 831* (Gray Herb. and U. S. Nat. Herb.).

Nebraska: on sterile hills, White River Valley, May, 1855, *Hayden* (Mo. Bot. Gard. Herb.); Warbonnet Cañon, alt. 1525 m., June, 1890, *ex Herb. T. A. Williams* (Mo. Bot. Gard. Herb.).

Montana: high sterile hills on the Yellowstone River, coll. of 1853–1854, *Hayden* (Mo. Bot. Gard. Herb.); on Teton River in the Rocky Mountains, June, 1854, *Doty* (Mo. Bot. Gard. Herb.); Little Belt Mountains, alt. 2285 m., 12 Aug., 1883, *Scribner 121* (Gray Herb. and Phil. Acad. Nat. Sci. Herb.); near Jefferson River, 15 June, 1883, *Scribner 121b* (Gray Herb. and Phil. Acad. Nat. Sci. Herb.); Madison River, 13 June, 1883, *Scribner 121c* (Phil. Acad. Nat. Sci. Herb.); near Livingston, 5 June, 1883, *Scribner 121a* (Gray Herb.), and *121d* (Gray Herb. and Phil. Acad. Nat. Sci. Herb.); Mt. Helena, Helena, 30 June, 1883, *Canby 205* (Phil. Acad. Nat. Sci. Herb.); rocks above Hodson's Coal Mine, 4 Aug., 1887, *F. H. Knowlton* (U. S. Nat. Herb. No. 201423); Livingston, 25 May, 1901, *Mrs. E. W. Scheuber 171* (U. S. Nat. Herb. and Mont. Agr. Coll. Herb.); Bozeman, 30 June, 1888, *F. H. Knowlton* (U. S. Nat. Herb. No. 202932); Belt Creek, June, 1883, *F. W. Anderson 545* (U. S. Nat. Herb. No. 515547); Custer, 22 May, 1890, *Blankinship 37* (U. S. Nat. Herb., Mont. Agr. Coll. Herb., and Mo. Bot. Gard. Herb.); Helena, July, 1891, *F. D. Kelsey* (Mont. Agr. Coll. Herb.); Great Falls, 16 June, 1891, *R. S. Williams 78* (U. S. Nat. Herb. and Mont. Agr. Coll. Herb.); near Red Lodge, 28 July, 1893, *Rose 87* (U. S. Nat. Herb.); Spanish Basin, Madison Range, alt. 1825 m., 10 and 18 July, 1896, *Flodman 904, 905* (U. S. Nat. Herb.); Little Belt Mountains, near the Pass, alt. 2130 m., 10 Aug., 1896, *Flodman 903* (U. S. Nat. Herb.); vicinity of Missoula, 31 May, 1897, *M. J. Elrod 86* (Mont. Agr. Coll. Herb.); Bridger Mountains, alt. 2130 m., 12 June, 1897, *Rydberg & Bessey 5258* (Gray Herb., Berlin Herb., Mont. Agr. Coll. Herb., and U. S. Nat. Herb.);

Spanish Basin, Gallatin Co., alt. 1980 m., 15 June, 1897, *Rydberg & Bessey 5259* (Gray Herb., Mont. Agr. Coll. Herb., Berlin Herb., and U. S. Nat. Herb.); Gallatin and Park Counties, without date, *Burle Jones* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); dry uplands, Bozeman, 29 June, 1897, *Blankinship* (Gray Herb.); Baltic, 30 May, 1900, *E. V. Wilcox 278* (U. S. Nat. Herb.); Sedan, Gallatin Co., 11 June, 1901, *B. J. Jones* (Gray Herb.); university campus and hillsides, Missoula, alt. 1000 m., 11 June, 1901, *MacDougal 124* (Gray Herb. and U. S. Nat. Herb.); hills, Midvale, 16 June, 1903, *Umbach 70* (U. S. Nat. Herb.); Bozeman, 16 June, and dry ridges, Mt. Bridger, alt. 1825 m., 17 July, 1905, *Blankinship 290* (Phil. Acad. Nat. Sci. Herb. and U. S. Nat. Herb.); Mystic Lake, alt. 2040 m., 11 July, 1905, *Blankinship 290* (Mo. Bot. Gard. Herb.); near Bozeman, without date, *V. K. Chestnut & W. W. Jones 231* (U. S. Nat. Herb.).

Yellowstone National Park: East Fork, July, 1885, *Tweedy* (U. S. Nat. Herb.); dry hills near Mammoth Hot Springs, alt. 1825 m., June, 1893, *Burglehaus* (U. S. Nat. Herb. No. 49295); dry gravelly slopes, Glen Creek, 30 June, 1899, *A. & E. Nelson 5577* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); without definite locality, 13, 17, and 20 May, and 12, 15, and 18 June, 1902, *Mearns 690, 760, 825, 1061, 1153, 1225* (U. S. Nat. Herb.); Electric Peak, 26 July, 1902, "*E. C. S.*" *181* (U. S. Nat. Herb.).

Wyoming: rich wooded bottoms in Jackson's Hole on Snake River, alt. 1825 m., 15 June, 1860, *Hayden* (Mo. Bot. Gard. Herb.); on Madison River, alt. 1370–2130 m., 28 June, 1860, *Hayden* (Mo. Bot. Gard. Herb.); Northwestern Wyoming Exp., coll. of 1873, *Parry 169* (Gray Herb.); Yellowstone River, coll. of 1878, *Havard* (Gray Herb.); without locality, *Tweedy* (U. S. Nat. Herb. No. 49294); Horse Creek, 6 June, 1893, *A. Nelson 36* (U. S. Nat. Herb.); Saratoga, without date, *A. Nelson 115* (U. S. Nat. Herb.); northwestern Wyoming, coll. of 1893, *Rose 148* (U. S. Nat. Herb.); Red Hills, north of Laramie, 4 June, 1894, *A. Nelson 178* (Phil. Acad. Nat. Sci. Herb.); dry soil, Laramie Hills, 15 June, 1894, *A. Nelson 224* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.), *type*

of *S. Laramiensis*; Green River, 25 June, 1895, *Shear 4373* (U. S. Nat. Herb.); Pole Creek, 30 June, 1895, *A. Nelson 1379* (Mo. Bot. Gard. Herb.); Laramie Hills, 25 June, 1898, *A. Nelson 4360* (Mo. Bot. Gard. Herb.), *type* of *S. collinus*; Hoodoo Peak, alt. 3350 m., 10 Aug., 1897, *P. Koch 20* (Mont. Agr. Coll. Herb.); naked, red, triassic ridges, Sand Creek, Albany Co., 31 May, 1900, *A. Nelson 6957* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); Hunt Mountain, Big Horn Mountains, alt. 3050 m., 21 July, 1900, *J. G. Jack* (Gray Herb.); dry subalpine slopes, Medicine Bow Mountains, Albany Co., 2 Aug., 1900, *A. Nelson 7935* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); river bottoms, Encampment, Carbon Co., alt. 2740 m., 15 June, 1901, *Tweedy 4123* (U. S. Nat. Herb.); crevices of rocks, Leucite Hills, 17 June, 1901, *Merrill & Wilcox 505* (U. S. Nat. Herb.); dry grounds, Point of Rocks, 17 June, 1901, *Merrill & Wilcox 669* (U. S. Nat. Herb.); dry hillsides, Dyer's Ranch, Carbon Co., 21 June, 1901, *Goodding 79* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); dry hillsides, Red Buttes, Albany Co., June, 1903, *A. Nelson 8937* (U. S. Nat. Herb.).

Colorado: dry summits at limit of trees, near Golden City, coll. of 1871, *E. L. Greene 534* (Gray Herb.); Floral Mountain, near Georgetown, alt. 3960 m., 16 Aug., 1884, *C. S. Sheldon 274* (U. S. Nat. Herb.); Silverton, July, 1889, *Eastwood* (U. S. Nat. Herb.); Mt. Princeton, Chaffee Co., alt. 3655 m., 23 July, 1892, *C. S. Sheldon 162, 482* (U. S. Nat. Herb.); mountains northeast of Boreas, alt. 3350–3960 m., 2 Aug., 1895, *State Agr. Coll. Colo. 3028* (U. S. Nat. Herb.); alpine rocky ridges, Rabbit Ears, Larimer Co., 14 June, 1903, *Goodding 1539* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.).

Utah: Uintas, alt. 3810 m., Aug., 1869, *Watson 672* (Gray Herb. and U. S. Nat. Herb.); Brigham Peak, alt. 3565 m., 29 Aug., 1894, *M. E. Jones 5941* (Mo. Bot. Gard. Herb.); Mt. Barrette, 26 July, 1905, *Rydberg & Carlton 7222* (U. S. Nat. Herb.).

**121. *S. Howellii*** Greene, Bull. Torr. Bot. Club 8: 98. 1881; Greenm. Monogr. *Senecio*, I. Teil, 24. 1901, and in Engl. Bot.



Jahrb. **32** : 20. 1902; Piper, Contr. U. S. Nat. Herb. **11** : 599. 1906; Piper & Beattie, Fl. S. E. Wash. & Adjacent Idaho, 274. 1914.

*S. canus* Torr. Bot. Wilkes' U. S. Expl. Exp. 367. 1874, in part, not Hook.; Gray, Syn. Fl. N. Am. **12**: 390. 1884, and ed. 2, 1886, in part, not Hook.; Holzinger, Contr. U. S. Nat. Herb. **3** : 235. 1895, not Hook.

*S. Purshianus* Howell, Fl. N. W. Am. **1** : 378. 1900, not Nutt.

An herbaceous caespitose perennial, at first white-tomentose, later more or less glabrate; stems 1 to 3 dm. high, erect, simple or branched, rather freely stoloniferous at the base; basal and lower stem-leaves elliptic-lanceolate to narrowly oblanceolate, including the petiole 2 to 12 cm. long, .5 to 1.5 cm. broad, obtuse or acute at the apex, entire to subpinnately and irregularly lobed, narrowed below into a slender petiole equalling or exceeding the blade, at first white-tomentose on both surfaces, later more or less glabrate especially on the upper surface, margins often revolute; upper stem-leaves usually much reduced, lanceolate to lance-linear, sessile, entire to dentate-lobed, not infrequently subauriculate at the base; inflorescence a terminal few to several-headed corymbose cyme; heads 8 to 10 mm. high, radiate; involucre campanulate, sparingly calyculate; bracts of the involucre usually about 13, linear-lanceolate, 5 to 7 mm. long, glabrous or nearly so; ray-flowers about 8, rays yellow; disk-flowers 30 to 40; achenes glabrous.

Distribution: Idaho and Washington, south to Utah and northern California.

Specimens examined:

Idaho: valley of Spokane River, Kootenai Co., 18 July, 1892, *Sandberg, MacDougal & Heller 668* (U. S. Nat. Herb.); Big Butte Station, 21 June, 1893, *E. Palmer 206* (U. S. Nat. Herb.); about Lake Waha, Nez Perces Co., alt. 610–1065 m., 29 June, 1896, *A. A. & E. G. Heller 3340* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.), form with both radiate and discoid heads; dry hillsides, Three Creek, Owyhee Co., 1 July, 1912, *Nelson & Macbride 1863* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); dry soil, Fernan Flats, Coeur d'Alene, July, 1912, *H. J. Rust 112* (U. S. Nat. Herb.); old lava plain, Martin,

Blaine Co., alt. 1830 m., 5 July, 1916, *Macbride & Payson 3038* (Mo. Bot. Gard. Herb.); moist protected slopes among rocks, western slope of Lemhi Mountains, near Patterson, Lemhi Co., alt. 1950 m., *Macbride & Payson 3196* (Mo. Bot. Gard. Herb.).

Washington: "Columbia River opposite the mouth of the Deschutes," Klickitat Co., June, 1881, *Howell* (Gray Herb., Greene Herb., Univ. of Notre Dame, and U. S. Nat. Herb.); stony hillsides, upper Columbia River, June, 1881, *T. J. Howell* (Greene Herb., Univ. of Notre Dame), TYPE—originally recorded by Greene as "on the upper Columbia River in Oregon"; Spokane Co., 14 June, 1884, *Suksdorf 375* (Gray Herb.); Hangman Creek, Spokane Co., 10 June, 1889, *Suksdorf 934* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); near Rock Island, Kittitas Co., alt. 760 m., 14 July, 1893, *Sandberg & Leiberg 457* (U. S. Nat. Herb.); in loose gravel, Spokane, 2 July, 1896, *C. V. Piper 2267* (Gray Herb.); between Grand Ronde Cañon and Fisher's Gulch, alt. 1250 m., 1 June, 1897, *Sheldon 8227* (Field Mus. Herb.); hill near Wenatchee, 9 June, 1901, *Whited 1361* (U. S. Nat. Herb.); Clark Springs, Spokane, 7 July, 1902, *F. O. Kreager 98* (Gray Herb. and U. S. Nat. Herb.); hillsides, Wenatchee Mountains, Kittitas Co., alt. 1615 m., 29 June, 1903, *J. S. Cotton 1249* (Gray Herb.); Cheyney, Spokane Co., *Mrs. Susan Tucker 90* (Gray Herb.); Wenatchee, 19 May, 1905, *Whited 2622* in part (U. S. Nat. Herb. No. 620360); south of Gulch No. 2, Wenatchee, 11 June, 1899, *Whited 1142* (U. S. Nat. Herb.).

Oregon: Cascade Mountains, coll. of 1860, *Dr. Lyall* (Gray Herb.); without definite locality, Wilkes' U. S. Expl. Exp., 1838–1842, *Wilkes* (U. S. Nat. Herb. No. 49288 in part); without definite locality, *Geyer 489* (Gray Herb.); Union Co., coll. of 1878, *Cusick 636* (Gray Herb.); Union Co., coll. of 1883, *Cusick 1095* (Gray Herb.); Cold Camp and Harvey Valley, 11 May, 1885, *Howell 455, 456* (Gray Herb.); Stein's Mountains, 28 May, 1885, *Howell* (U. S. Nat. Herb. and Phil. Acad. Nat. Sci. Herb.); near camp on Pine Creek, Gilliam Co., alt. 1090 m., 7 June, 1894, *Leiberg 169* (U. S. Nat. Herb., Mo. Bot. Gard. Herb., and Univ. Ariz. Herb.), form with most of the leaves lobed; Otis Creek, Malheur Co., alt. 1100 m., 19 June,

1896, *Leiberg 2328* (U. S. Nat. Herb.); Strawberry Butte, Blue Mountains, above timber line, alt. 2665–2770 m., 13 July, 1896, *Coville 562* (U. S. Nat. Herb.); hills, Malheur Co., June, 1897, *Cusick 1626* (Mo. Bot. Gard. Herb.); without definite locality, coll. of 1897, *Sheldon 8227, 8403* (U. S. Nat. Herb.); Stein's Mountains, 30 June, 1898, *Cusick 2188* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); in pumice field at the Palisades, Crater Lake National Park, 4 Sept., 1902, *Coville 1476* (U. S. Nat. Herb.); on rocky ledges, Pilot Butte, Crook Co., 19 June, 1905, *E. Nelson 856* (Mo. Bot. Gard. Herb.); dry sagebrush land, vicinity of Laidlaw, Crook Co., 10 July, 1906, *Whited 3058* (U. S. Nat. Herb.); Forked Horn Butte, 2 June, 1907, *Whited* (U. S. Nat. Herb. No. 620384); abundant on outskirts of open yellow pine forests, Billy Meadows, Wallowa National Forest, 7 Aug., 1908, *James T. Jardine 345* (U. S. Nat. Herb.); common on the desert, near Laidlaw, 15 June, 1912, *Whited A54* (U. S. Nat. Herb.).

Nevada: Summit Lake Region, July, 1901, *Griffiths & Morris 319* (U. S. Nat. Herb.); Clover Mountain Range, near Deeth, Elko Co., alt. 2070 m., 22 July, 1908, *Heller 9101* (U. S. Nat. Herb., Phil. Acad. Nat. Sci. Herb., and Mo. Bot. Gard. Herb.); moist ravine, Bunker Hill, Toiyabe Forest, alt. 2250–3400 m., *Hitchcock 854* (U. S. Nat. Herb.); Bunker Hill, Toiyabe Range, Lander Co., alt. 3200 m., 29 July, 1913, *Kennedy 4086* (Mo. Bot. Gard. Herb.); dry hill, Pine Mountain, vicinity of Gold Creek, 7 Aug., 1913, *Hitchcock 1102* (U. S. Nat. Herb.); Ruby Mountains, near Blaine Post-office, alt. 2710 m., 22 Aug., 1913, *Heller 11097* (Mo. Bot. Gard. Herb.).

California: Modoc Co., July, 1885, *Mrs. R. M. Austin* (U. S. Nat. Herb. No. 310576); White Mountains, Mono Co., alt. 3655 m., 19 Aug., 1888, *Shockley 598* (Gray Herb.); on rocky ridge at Castle Peak, (?) Mono Co., alt. 2740 m., 7 Aug., 1900, *Leiberg 5292* (U. S. Nat. Herb. No. 610540).

Var. **lithophilus** Greenm. Bot. Gaz. 48: 148. 1909.

*S. aureus* var. *borealis* Torr. Bot. Wilkes' U. S. Expl. Exp. 307. 1874, not Torr. & Gray.

Stems 1 to 3 dm. high, erect or ascending; basal and lower stem-leaves subovate to oblanceolate, including the petiole 1.5

to 15 cm. long, .5 to 3 cm. broad, rounded to obtuse at the apex, entire to irregularly dentate-lobed, occasionally somewhat glabrate; upper stem-leaves often relatively large and conspicuous.

Distribution: western Montana to Washington and Oregon.

Specimens examined:

Montana: ridge above Missoula, 2 Aug., 1880, *Watson 234* (Gray Herb.); Missoula Valley, July, 1892, *Aiton* (Mo. Bot. Gard. Herb.); Bozeman Cañon, 25 July, 1895, *C. L. Shear 3522* (U. S. Nat. Herb.); dry ground, Hamilton, alt. 1065 m., 14 June, 1906, *Blankinship 779* (U. S. Nat. Herb.); dry hill-sides, Lolo Valley, Lolo, Aug., 1912, *J. E. Kirkwood 80* (Mo. Bot. Gard. Herb.).

Idaho: in loose gravel and on granite ledges, subalpine stations around Lake Pend d'Oreille, June, 1891, *Leiberg 556* (Mo. Bot. Gard. Herb.); mountain tops of Salmon River Mountains, alt. 3750 m., 17 Aug., 1895, *Henderson 3845* (U. S. Nat. Herb.), form; in small clumps on granite, Mackay, Custer Co., 1 Aug., 1911, *Nelson & Macbride 1540* (Mo. Bot. Gard. Herb.); sagebrush draws, Lost River Mountains, near Clyde, Blaine Co., 10 July, 1916, *Macbride & Payson 3847* (Mo. Bot. Gard. Herb.); dry rocky slopes, Squaw Creek, near Clayton, Custer Co., 23 July, 1916, *Macbride & Payson 3371* (Mo. Bot. Gard. Herb.).

Washington: Wenatchee, 19 May, 1905, *Whited 2622* in part (U. S. Nat. Herb. No. 620359).

Oregon: east side of Cascade Mountains, Wilkes' U. S. Expl. Exp., 1838-1842, *Wilkes* (U. S. Nat. Herb. No. 40121); Stein's Mountains, opposite Devine Ranch, alt. 2200 m., 4 July, 1896, *Leiberg 2481* (U. S. Nat. Herb.); hills, Malheur Co., June, 1897, *Cusick 1626* (U. S. Nat. Herb.); Crow Creek, Wallowa Co., alt. 1250 m., *Sheldon 8403* (Mo. Bot. Gard. Herb.); dry rocky granitic soil, on the Imnaha River, Wallowa Mountains, alt. 2000 m., Aug., 1906, *Cusick 3129* (Field Mus. Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.), TYPE; limestone rocks, source of the Imnaha, alt. 2740 m., 14 Aug., 1910, *Cusick 3382* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.).

Var. *eradiatus* (Wats.) Greenm. comb. nov.

*S. canus* var. *eradiatus* Wats. Bot. King's Exp. 190. 1871.

Stems about 1 dm. high; lower leaves subovate to oblanceolate, including the petiole 3 to 8 cm. long, .5 to 2 cm. broad, entire or somewhat dentate; heads discoid.

Specimens examined:

Nevada: East Humboldt Mountains, alt. 3050 m., U. S. Geol. Expl. of the 40th Parallel, Aug., 1868, *Watson 673* (Gray Herb. and U. S. Nat. Herb.), TYPE.

**122. *S. oreopolus*** Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902, name only; Ann. Mo. Bot. Gard. **1** : 268, *pl. 11*. 1914.

*S. canus* Gray, Bot. Calif. **1** : 412. 1876, in part, not Hook.; Coville, Contr. U. S. Nat. Herb. **4** : 139. 1893, not Hook.; Greene, Fl. Franciscana, 469. 1897, not Hook.

*S. kernensis* Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902.

A low herbaceous perennial, white-tomentose throughout; stems erect or nearly so, simple or branched, .8 to 3 dm. high, often producing elongated slender stolons at the base; basal and lower stem-leaves petiolate, ovate to ovate-elliptic, including the petiole 2 to 10 cm. long, .5 to 2 cm. broad, rounded to obtuse or sometimes acute at the apex, entire or sparingly dentate, usually permanently white-tomentose on both surfaces, occasionally more or less glabrate, thick and firm in texture; uppermost stem-leaves sessile, lance-linear, entire to irregularly dentate; inflorescence a terminal corymbose cyme; heads few to many, about 1 cm. high, radiate; involucre campanulate, sparingly calyculate; bracts of the involucre commonly 13 (9–13), narrowly lanceolate, 5–7 mm. long, acute, glabrous or slightly tomentulose; ray-flowers 5 to 13, rays yellow; disk-flowers 20 to 30; achenes glabrous.

Distribution: high mountains of California and western Nevada.

Specimens examined:

California: near summit of Silver Mountain, alt. 3350 m., Geol. Surv. Calif., 5 Aug., 1863, *Brewer 2050* (Gray Herb. and U. S. Nat. Herb.); Sonora Pass, alt. 2435–2740 m., Geol. Surv.

Calif., July, 1863, *Brewer 2686* (Gray Herb. and U. S. Nat. Herb.); hill above Camp 131, Ebbett's Pass, alt. 2590–2740 m., Geol. Surv. Calif., 1 Aug., 1863, *Brewer 2005* (Gray Herb. and U. S. Nat. Herb.); Mono Pass, Geol. Surv. Calif., 1866, *Bolander 6140* (Gray Herb. and U. S. Nat. Herb.); South Fork of Kern River, alt. 3718 m., Wheeler's Expl. & Surv. west of the 100th Meridian, Sept., 1875, *Rothrock 334* (Gray Herb., U. S. Nat. Herb., and Field Mus. Herb.), *type* of *S. kernensis*; Sierra Nevada, coll. of 1875, *John Muir 4452* (Mo. Bot. Gard. Herb.); Mt. Shasta, above timber line, Aug., 1877, "*A. S. P. Jr.*" (Field Mus. Herb. No. 277271); Mt. Stanford, 17 July, 1887, *C. F. Sonne 373* (Phil. Acad. Nat. Sci. Herb.); near Whitney Meadows, Sierra Nevada, 20 Aug., 1891, Death Valley Exp., *Coville & Funston 1647* (U. S. Nat. Herb.); gravelly slopes, Little Kern River, alt. 3050–3350 m., April–Sept., 1897, *Purpus 5240* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); north side near Sheep Rock, Mt. Shasta, Siskiyou Co., alt. 853 m., June, 1903, *Hall & Babcock 4095* (Gray Herb.); Castle Peak, near the highest point, alt. 2740 m., 5 Aug., 1903, *Heller 7102* (Gray Herb., U. S. Nat. Herb., Phil. Acad. Nat. Sci. Herb., C. C. Deam Herb., and Mo. Bot. Gard. Herb.); Natural Bridge, Volcano Creek, basin of the Upper Kern River, Tulare Co., alt. 2285 m., July, 1904, *Hall & Babcock 5433* (Gray Herb.); Rock Creek Cañon, basin of the Upper Kern River, Tulare Co., alt. 3050 m., July, 1904, *Hall & Babcock 5526* (Gray Herb. and Univ. Ariz. Herb.), *TYPE*.

Nevada: Mt. Rose, Washoe Co., 25 July, 1907, *C. L. Brown* (Phil. Acad. Nat. Sci. Herb. No. 537022); Mt. Rose, Washoe Co., alt. 3200 m., 28 July, 1909, and 26 Aug., 1911, *Heller 9882* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.).

Forma ***aphanactis*** Greenm. Ann. Mo. Bot. Gard. 1 : 269. 1914.

Stems about 1 dm. high; leaves including the petiole 1.5 to 2.5 cm. long, 5 to 7 mm. broad; heads discoid.

Specimens examined:

California: mountain peak, near Sonora Pass, alt. 3200 m., Geol. Surv. Calif., 1863, *Brewer 1905* (Gray Herb. and U. S. Nat. Herb.), *TYPE*.

**123. *S. Hallii*** Britton, Trans. N. Y. Acad. Sci. **9** : 11. 1889; Rydb. Mem. N. Y. Bot. Gard. **1** : 445. 1900. Pl. 4, fig. 2.

A low caespitose herbaceous perennial, densely and conspicuously white-tomentose throughout; stems erect, 1 to 1.8 dm. high, simple or branched; basal and lower stem-leaves spatulate to oblanceolate, 1.5 to 5 cm. long, 4 to 10 mm. broad, densely and permanently white-tomentose on both surfaces, rounded to obtuse at the apex, entire, often revolute-margined, narrowed into a petiole about equalling the blade; upper stem-leaves few, sessile, lanceolate, and often somewhat amplified into an entire or toothed semiamplexicaul base; inflorescence a terminal few to several-headed corymbose cyme; heads 8 to 10 mm. high, radiate; involucre campanulate, sparingly calyculate; bracts of the involucre about 13, linear-lanceolate, 5 to 6 mm. long, at first densely white-tomentose, later more or less glabrate; ray-flowers 8, rays pale yellow; disk-flowers about 30; achenes glabrous.

Distribution: known only from geyser formations of Yellowstone National Park.

Specimens examined:

Yellowstone National Park: on geyserite, June, 1888, *Rev. Dr. Charles H. Hall* (N. Y. Bot. Gard. Herb. and Greene Herb., Univ. of Notre Dame), TYPE; directly on geyserite, Shoshone Geyser Basin, alt. 2375 m., 23–26 Aug., “*C. R.*” (Gray Herb.); National Park, alt. 2438 m., 3 Aug., 1885, *Letterman* 259 (Mo. Bot. Gard. Herb.); Upper Geyser Basin, alt. about 2135 m., 8 Aug., 1897, *Rydb. & Bessey* 5257 (Gray Herb., Greene Herb., Univ. of Notre Dame, Mont. Agr. Coll. Herb., and U. S. Nat. Herb.); Mammoth Hot Springs, 5 July, 1899, *Blankinship* (Gray Herb.); Upper Geyser Basin, 12 July, 1899, *Blankinship* (Gray Herb.); Lower Geyser Basin, 13 July, 1899, *Blankinship* (Gray Herb.); without definite locality, 16 Sept., 1902, *Mearns* 4059 (U. S. Nat. Herb.); Upper Basin, 17 July, 1912, *Churchill* (J. R. Churchill Herb.).

**124. *S. candidissimus*** Greene, Pittonia **4** : 110. 1900.

An herbaceous perennial, densely and permanently white-tomentose throughout; stems ascending or suberect, 1.5 to 2.5

dm. high, from a more or less elongated subligneous rootstock; leaves chiefly basal, oblong-obovate to narrowly oblong-ob lanceolate, 3 to 7 cm. long, .5 to 1.5 cm. broad, rounded to obtuse at the apex, entire or subdentate towards the tip, gradually narrowed below into a slightly winged petiole, persistently white-tomentose on both surfaces, margins often revolute; upper stem-leaves few, much reduced, bracteiform; inflorescence a terminal few-headed corymbose cyme; heads 10 to 12 mm. high, radiate; involucre campanulate, sparingly calyculate, tomentulose; bracts of the involucre 13 to 21, linear-lanceolate, about 6 mm. long, acute; ray-flowers commonly 8, rays yellow; disk-flowers about 50; achenes glabrous.

Distribution: mountains of northern Mexico.

Specimens examined:

Chihuahua: near Colonia Garcia in the Sierra Madre, alt. 2285 m., 24 May, 1899, *Townsend & Barber 1* (Greene Herb., Univ. of Notre Dame, Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.), TYPE; Sierra Madre, 21 June–29 July, 1899, *E. W. Nelson 6005* (U. S. Nat. Herb.).

**125. *S. bellidifolius* HBK.** Nov. Gen. & Sp. **4** : 175. 1820; Schlecht. & Cham. Linnaea **5** : 161. 1830; DC. Prodr. **6** : 429. 1837; Hemsl. Biol. Cent.-Am. Bot. **2** : 236. 1881.

*S. pauciflorus* HBK. Nov. Gen. & Sp. **4** : 176, *pl. 365*. 1820, not Pursh.

*S. cheiranthifolius* HBK. Nov. Gen. & Sp. **4** : 176. 1820; DC. Prodr. **6** : 429. 1837; Hemsl. Biol. Cent.-Am. Bot. **2** : 237. 1881.

*S. Vulneraria* DC. Prodr. **6** : 428. 1837; Hemsl. Biol. Cent.-Am. Bot. **2** : 248. 1881; Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902.

*S. tricephalus* Klatt in Herb.

*Cineraria vulneraria* Alam. ex DC. Prodr. **6** : 428. 1837.

A low caespitose herbaceous perennial, at first white-tomentose throughout, more or less glabrate; stems erect or nearly so, 1 to 2.5 dm. high; leaves chiefly basal, subobovate to narrowly oblong-ob lanceolate, 2 to 8.5 cm. long, 5 to 12 mm. broad, rounded to submucronate-acute at the apex, entire to somewhat dentate, gradually narrowed below into a petiole equal-



ling or exceeding the blade, at first white-tomentose on both surfaces, more or less glabrate especially on the upper surface, margins often revolute; upper stem-leaves few, remote, linear or linear-lanceolate, bracteiform; inflorescence a terminal few-headed (1-5) cyme; heads 10 to 14 mm. high, sessile or pedunculate, radiate; involucre campanulate, sparingly calyculate, tomentulose; bracts of the involucre 13 to 21, linear-lanceolate, 7 to 8 mm. long; ray-flowers about 10, rays yellow; disk-flowers 45 to 60; achenes glabrous.

Distribution: Mexico.

Specimens examined:

Chihuahua: vicinity of Madera, alt. about 2250 m., 27 May-3 June, 1908, *Dr. Ed. Palmer 277* (U. S. Nat. Herb., Field Mus. Herb., and Mo. Bot. Gard. Herb.).

State of Mexico: Nevada de Toluca, alt. 3960 m., 2 Sept., 1892, *Pringle 5332* (Gray Herb. and Mo. Bot. Gard. Herb.); meadows, Mt. Ixtaccihuatl, alt. 3350-3655 m., March-July, 1903, *Purpus 267* (Mo. Bot. Gard. Herb.).

Federal District: grassy slopes, Serrania de Ajusco, alt. 2985 m., 16 April, 1898, *Pringle 6797* (Gray Herb., Phil. Acad. Nat. Sci. Herb., and Mo. Bot. Gard. Herb.).

Hidalgo: open spaces, Sierra de Pachuca, alt. 3050 m., 23 Aug., 1902, *Pringle 9960* (Gray Herb. and Mo. Bot. Gard. Herb.).

Southern Mexico: near Huajalote Rancho, March, 1837, *Ehrenberg 847* (Berlin Herb. and Gray Herb.); Jorullo, *Humboldt & Bonpland* (Berlin Herb., fragment and tracing in Gray Herb.), TYPE; Mt. Orizaba, *Schiede 359* (Berlin Herb., tracing in Gray Herb.); peak of Orizaba, alt. 3500 m., June-Oct., 1840, *Galeotti 2184* (Gray Herb.); Province of Vera Cruz, alt. 3050-3655 m., April, 1856, *Sartorius* (Gray Herb.); peak of Orizaba, *Liebmann 141* (Copenhagen Herb., fragment and tracing in Gray Herb.); near Moran and Regla, *Humboldt & Bonpland* (Paris Herb., tracing in Gray Herb.), type of *S. cheiranthifolius*; Mt. Orizaba, alt. 4265 m., 7 Aug., 1891, *Seaton 239* (Gray Herb.); slope of Mt. Orizaba, alt. 4420 m., 25 Feb., 1892, *J. G. Smith* (Mo. Bot. Gard. Herb.).

- 126. *S. loratifolius*** Greenm. Proc. Am. Acad. **43**: 21. 1907. Pl. 5.

An herbaceous perennial; stems erect, about 3 dm. high, white-lanate-tomentose; leaves alternate, narrowly elongate-lanceolate or subllorate, .5 to 1.7 dm. long, 4 to 12 mm. broad, acute or obtuse, entire, membranous, in the early stages lightly floccose-tomentulose on the upper surface and more or less glabrate, densely and permanently white-tomentose beneath; the lower leaves gradually narrowed into a petiole-like base, the upper, sessile and amplexicaul; inflorescence a terminal few-headed subcorymbose cyme; heads radiate, 8 to 10 mm. high; involucre campanulate, calyculate, tomentose; bracts of the involucre usually 13, linear-lanceolate, 6 to 7 mm. long; ray-flowers 8 to 12, rays yellow; disk-flowers about 35; achenes hispidulous.

Distribution: northern Mexico.

Specimen examined:

Coahuila: mountains near Saltillo, alt. 2150 m., 5 Oct., 1905, *C. G. Pringle 13676* (Gray Herb.), TYPE.

- 127. *S. cynthioides*** Greene, Leaf. Bot. Obs. & Crit. **1**: 212. 1906; Wootton & Standley, Contr. U. S. Nat. Herb. **19**: 748. 1915.

*S. fastigiatus* Gray, Pl. Wright., pt. 2, 99. 1853, not Nutt.

*S. Wrightii* Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32**: 20. 1902, name only; Ann. Mo. Bot. Gard. **1**: 269. 1914.

*S. Fendleri* var. *subintegra* Greene in Herb.

An herbaceous perennial, subtomentose throughout, more or less glabrate especially on the upper leaf-surface; stems erect, 1 to 4 dm. high, usually rather leafy; leaves narrowly oblong-ob lanceolate to lanceolate-linear, entire or sparingly dentate towards the tip, rounded to obtuse at the apex, in the early stages somewhat tomentulose on the upper surface but soon glabrate, more or less persistently white-tomentulose beneath, the lowermost leaves gradually narrowed into a petiole; upper stem-leaves sessile, often amplified and irregularly dentate at the semiamplexicaul base; inflorescence a terminal sub-

corymbose many-headed cyme; heads 8 to 10 mm. high, minutely calyculate, radiate; involucre campanulate; bracts of the involucre usually 13, narrowly lanceolate, 5 to 7 mm. long, acute, tomentose to nearly glabrous; ray-flowers 6 to 8, rays narrowly oblong, about 8 mm. long, 4-5-nerved, yellow; disk-flowers about 30; achenes glabrous.

Distribution: mountains of New Mexico and Arizona.

Specimens examined:

New Mexico: Mogollon Mountains, alt. 2435 m., 23 Aug., 1903, *Metcalf* 574 (Greene Herb., Univ. of Notre Dame, U. S. Nat. Herb., Univ. Ariz. Herb., and Mo. Bot. Gard. Herb.), TYPE; ravines between the Copper Mines and the Mimbres, Oct., 1851, *Wright* 1289 (Gray Herb., Phil. Acad. Nat. Sci. Herb., and Mo. Bot. Gard. Herb.), type of *S. Wrightii*; valley of the Rio Grande, *Mex. Bound. Survey* 656 (U. S. Nat. Herb. Nos. 49352, 49353); Santa Rita del Cobre, 22 Sept., 1880, *E. L. Greene* (Mo. Bot. Gard. Herb.); Lookout Mine, Sierra Co., 22 July, 1904, *Metcalf* 1179 (Mo. Bot. Gard. Herb.); open slope, Navajo Indian Reservation, in the Tunitcha Mountains, 8 Aug., 1911, *Standley* 7678 (U. S. Nat. Herb.); Tierra Blanca Cañon, alt. 2070 m., 16 Aug., 1915, *W. R. Chapline* (U. S. Nat. Herb.).

Arizona: open steep slopes, head of Little Colorado River, 10 July, 1912, *Goodding* 1146 (Univ. Ariz. Herb.).

**128. *S. fastigiatus*** Nutt. Trans. Am. Phil. Soc. N. S. 7: 410. 1841; Torr. & Gray, Fl. N. Am. 2: 439. 1843; Gray, Syn. Fl. N. Am. 1<sup>2</sup>: 390. 1884, and ed. 2, 1886, excl. var. *Layneae*; Heller, Cat. N. Am. Pl. 146. 1898, and ed. 2, 229. 1900; Howell, Fl. N. W. Am. 378. 1900; Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. 32: 20. 1902; Piper, Contr. U. S. Nat. Herb. 11: 599. 1906; Piper & Beattie, Fl. Northwest Coast, 389. 1915.

*S. spatuliformis* Heller, Bull. Torr. Bot. Club 26: 552. 1899.

*S. ligulifolius* Greene, Leaf. Bot. Obs. & Crit. 2: 14. 1909.

*S. leucocrinus* Greene, Leaf. Bot. Obs. & Crit. 2: 14. 1909.

An herbaceous perennial, white-tomentose or floccose-tomentulose to nearly glabrous; stems one to several from an ascending rootstock, erect, 2 to 6 dm. high, simple or branched;

leaves narrowly oblong-ob lanceolate, including the petiole 3.5 to 22 cm. long, .5 to 2 cm. broad, rounded to acute at the apex, entire or sinuately denticulate, gradually narrowed below into a slender petiole, thickish in texture, margins usually revolute; upper stem-leaves similar, gradually reduced towards the top of the stem to sessile, linear and entire or denticulate bracts; inflorescence a terminal few to several-headed corymbose cyme; heads about 1 cm. high, radiate; involucre campanulate, sparingly calyculate, tomentulose or glabrous; bracts of the involucre about 13, linear-lanceolate, 6 to 8 mm. long; ray-flowers commonly 8, rays yellow; disk-flowers 30 to 45; achenes glabrous.

Distribution: Vancouver Island to Oregon.

Specimens examined:

British Columbia: in tufts in sand, Qualicum, Vancouver Island, 29 July, 1887, *Macoun* (Gray Herb. and Geol. Surv. Canada Herb.); northern point of Texada Island, Gulf of Georgia, 26 June, 1885, *Dawson 14801* (Geol. Surv. Canada Herb.); in tufts on gravel, Goldstream, Vancouver Island, 27 June, 1887, *Macoun* (Geol. Surv. Canada Herb. No. 16584); Mt. Benson, Vancouver Island, 10 July, 1893, *Macoun 555* (Mo. Bot. Gard. Herb.); dry slopes, Bald Mountain, Vancouver Island, alt. 450 m., 17 June, 1907, *Rosendahl 1853* (U. S. Nat. Herb.); Shawningan Lake, Vancouver Island, 18 June, 1908, *Macoun* (Geol. Surv. Canada Herb. No. 78955); vicinity of Nanaimo, Vancouver Island, 4 July, 1908, *Macoun* (Geol. Surv. Canada Herb. Nos. 78952, 78953); Langford Lake, vicinity of Victoria, 24 July, 1908, *Macoun* (Geol. Surv. Canada Herb. No. 78954); Mathalchea Lake, 11 July, 1911, *Spreadborough* (Geol. Surv. Canada Herb. No. 91258); Langford Lake, near Victoria, 24 May, 1915, *Newcombe* (Mo. Bot. Gard. Herb.).

Washington: Mill Plain, June, 1877, *Howell* (Gray Herb.); moist sandy plains, coll. of 1883, *Henderson 24* (Gray Herb.); dryish prairies, Pierce Co., 17 July, 1883, collector not indicated (Piper Herb.); Yelm Prairie, 5 Aug., 1889, *E. C. Smith* (Mo. Bot. Gard. Herb.); Yelm Prairie, July, 1890, *E. C. Smith 538* (U. S. Nat. Herb.); Union City, 4 July, 1890, *Piper* (Mo.

Bot. Gard. Herb.); Mason Co., 20 July, 1890, *Piper 538* (U. S. Nat. Herb.); near Elma, Chehalis Co., alt. 60 m., 19 July, 1898, *A. A. & E. G. Heller 4061* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.), *type* of *S. spatuliformis* Heller; Mt. Constitution, 5 July, 1907, *Cowles 446* (Mo. Bot. Gard. Herb.); Orcas Island, July, 1909, *C. J. Brues* (Pub. Mus. Milwaukee Herb.); Seattle, July, 1915, *G. W. Freiberg* (Mo. Bot. Gard. Herb.); Seattle, July, 1915, *S. M. Zeller* (Mo. Bot. Gard. Herb.); Mt. Constitution, alt. about 610 m., 30 July, 1917, *S. M. & E. B. Zeller 1067* (Mo. Bot. Gard. Herb.).

Oregon: "plains of the Oregon, near Wahlamet," and "R. Mts." [probably Oregon] *Nuttall* (Gray Herb.), *TYPE*; Clear Water, *Rev. Mr. Spalding* (Gray Herb.); without locality, *E. Hall 305* (Gray Herb. and Mo. Bot. Gard. Herb.); prairies, western Oregon, June, 1880, *T. J. Howell* (U. S. Nat. Herb. and Phil. Acad. Nat. Sci. Herb.); Portland, coll. of 1881, *Henderson 11* (Gray Herb.); Waldo, June, 1884, *Howell 161* (Gray Herb.); Blue Mountains, June, 1886, *Henderson* (Gray Herb.); Waldo, 14 June, 1904, *Piper 6102* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.), *type* of *S. ligulifolius* Greene; eight miles south of Waldo, 14 June, 1904, *Piper 6228* (U. S. Nat. Herb.); on cliffs of Cow Creek Mountains, Douglas Co., 15 June, 1915, *Cusick 4750* (Mo. Bot. Gard. Herb.); without locality, *W. Lobb 295* (Kew Herb.); "Wahlmet" [probably Willamette], *Tolmie* (Kew Herb.).

Var. **Macounii** (Greene) Greenm. Contr. U. S. Nat. Herb. 11 : 599. 1906; Piper & Beattie, Fl. Northwest Coast, 389. 1915. *S. Macounii* Greene, Pittonia 3 : 169. 1897.

*S. fastigiatus* var. *eroso-dentatus* Greenm. in Herb.

Stems 3 dm. or more high, simple or branched; similar to the species, but with somewhat larger and often coarsely erose-dentate stem-leaves.

Distribution: same range as the species.

Specimens examined:

British Columbia: on rocky slopes of Mt. Benson, 10 July, 1893, *Macoun 555* (Geol. Surv. Canada Herb. and Greene Herb., Univ. of Notre Dame, photograph in Mo. Bot. Gard. Herb.), *TYPE*; Goldstream, Vancouver Island, 25 July, 1893,

*Macoun 554* (Geol. Surv. Canada Herb. and Greene Herb., Univ. of Notre Dame).

Washington: dry rocky places, Mt. Constitution, San Juan Co., 12 July, 1904, *Flett 2743* (Gray Herb.).

Oregon: valley of Columbia River, Oregon Boundary Commission, 1860, *Dr. Lyall* (Kew Herb., Berlin Herb., fragment and tracing in Gray Herb.), *type* of var. *eroso-dentatus*; moist ground, Willamette Valley, near Tangent, 18 June, 1881, collector not indicated (Piper Herb.); Eugene, July, 1895, collector not indicated (Univ. Chicago Herb. at Field Mus. No. 366869).

**129. *S. umbraculifer*** Wats. Proc. Am. Acad. **23** : 279. 1888; Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902 (originally spelled *umbraculifera*).

An herbaceous perennial, densely white-tomentose throughout; stem simple, erect, 5 to 9 dm. high, rising from a stoutish slightly ascending rootstock; leaves oblong-ob lanceolate, 5 to 20 cm. long, .5 to 2.5 cm. broad, apiculate-acute, entire or denticulate, gradually narrowed into a winged petiole, densely and permanently white-tomentose on both surfaces; upper stem-leaves sessile, narrowly oblong-lanceolate; inflorescence a terminal many-headed corymbose cyme; heads about 1 cm. high, radiate; involucre campanulate, calyculate; bracts of the involucre about 13, linear-lanceolate, 6 to 7 mm. long and, as well as the bracteoles, terminated by a brownish tip; ray-flowers 5 to 8, rays yellow, conspicuous; disk-flowers 14 to 20; achenes hispidulous.

Distribution: northern Mexico.

Specimens examined:

Chihuahua: summits of the Sierra Madre, alt. 2950 m., 3 Oct., 1887, *Pringle 1316* (Gray Herb., U. S. Nat. Herb., and Phil. Acad. Nat. Sci. Herb.), TYPE.

**130. *S. atratus*** Greene, Pittonia **3** : 105. 1896; Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. **32** : 20. 1902; Rydb. Fl. Colo. 395. 1906; Nelson in Coulter & Nelson, Manual Cent. Rocky Mountains, 580. 1909, in

part; Daniels, Univ. Mo. Studies, Sci. Ser. 2: 399 [251]. 1911; Wootton & Standley, Contr. U. S. Nat. Herb. 19: 746. 1915. Pl. 6.

*S. exaltatus* var. *minor* Gray, Mem. Am. Acad. N. S. 4: 108. 1849, as to plant of Fendler; Am. Jour. Sci. II. 33: 238. 1862.

*S. lugens* var. *exaltatus* Eaton in Bot. King's Exp. 188. 1871, mainly; Porter & Coulter, Fl. Colo. 80. 1874, not *S. exaltatus* Nutt.

*S. lugens* var. *foliosus* Gray, Bot. Calif. 1: 413. 1876; Syn. Fl. N. Am. 12: 388. 1884, and ed. 2, 1886; Coulter, Manual Rocky Mountain Region, 209. 1885.

An herbaceous perennial, white floccose-tomentose throughout; stems erect or nearly so, 2 to 6 dm. high, from an ascending stoutish rootstock, rather leafy; basal and lower stem-leaves oblong-obovate to oblanceolate, narrowed below into a winged petiole, including the petiole .5 to 3 dm. long, 1.5 to 5.5 cm. broad, mucronate-acute, subentire to sinuate-dentate, permanently floccose-tomentose on both surfaces; upper stem-leaves sessile, lanceolate, usually becoming smaller towards the terminal compound corymbose or round-topped cyme; heads numerous, 10 to 12 mm. high, radiate; involucre narrowly campanulate or somewhat cylindrical, calyculate with a few setaceous bracteoles; bracts of the involucre commonly 8, linear-oblong to linear-lanceolate, 6 to 7 mm. long, obtusish and, as well as the bracteoles, conspicuously black-tipped; ray-flowers 4 or 5, rays yellow; disk-flowers 8 to 12; achenes glabrous.

Distribution: Colorado and Utah, south to New Mexico.

Specimens examined:

Colorado: head-waters of Clear Creek, and the alpine ridges lying east of "Middle Park," coll. of 1861, *Parry 23* (Gray Herb. and Mo. Bot. Gard. Herb.); Lat. 39–41°, coll. of 1862, *Parry 325* [23] (U. S. Nat. Herb. No. 349248); Lat. 39–41°, coll. of 1862, *Hall & Harbour 325* (Gray Herb., U. S. Nat. Herb., Phil. Acad. Nat. Sci. Herb., and Mo. Bot. Gard. Herb.); James Peak, 20 Aug., 1870, *Greene 223* (Gray Herb.); high mountains, Lat. 40–41°, alt. 3050–3655 m., Powell's Colo. Expl. Exp., 1868, *Vasey 335* (Gray Herb.); below Gray's Peak, 10

Aug., 1871, *Geo. Smith* (Phil. Acad. Nat. Sci. Herb.); Gray's Peak, 31 Aug., 1884, *Benj. H. Smith* (Phil. Acad. Nat. Sci. Herb.); Georgetown, alt. 2590 m., 19 July, 1892, *Crandall* (Mo. Bot. Gard. Herb.); mountain sides, near Empire, alt. 3050–3350 m., Aug.–Sept., 1892, *Patterson 252* (Gray Herb. and Mo. Bot. Gard. Herb.); Mosquito Gulch, alt. 3050 m., Hayden's U. S. Geol. Survey, 15 July, 1873, *J. M. Coulter* (U. S. Nat. Herb.); Graymont, 23 July, 1885, and near Graymont, alt. 3350 m., 26 July, 1886, *Letterman* (Mo. Bot. Gard. Herb.); Graymont, 9 Aug., 1888, *Holway* (U. S. Nat. Herb.); Tolland, alt. 2740 m., 5 July, 1913, *Overholts* (Mo. Bot. Gard. Herb.); Argentine Pass, 17 July, 1886, *ex Herb. Trelease* (Mo. Bot. Gard. Herb.); Breckenridge, coll. of 1892, *F. Wislizenus 1065* (Mo. Bot. Gard. Herb.); mountain side, Ida Bell Mine, Summit Co., alt. 3500 m., 8 Aug., 1917, *Clokey 2910* (I. W. Clokey Herb. and Mo. Bot. Gard. Herb.); near Breckenridge, alt. 3350 m., Aug., 1901, *Mackenzie 297* (Mo. Bot. Gard. Herb.); Red Cliff, Eagle Co., 17 July, 1902, *Osterhout 2702* (Phil. Acad. Nat. Sci. Herb.); Como, alt. 3050 m., 25 July, 1897, *Crandall 3079* (U. S. Nat. Herb.); Como, 1 Aug., 1895, *Crandall & Cowen 289* (U. S. Nat. Herb.); Twin Lakes, Wheeler's Expl. and Surv. west of the 100th Meridian, July, 1873, *Wolf & Rothrock 567* [575] (U. S. Nat. Herb. and Gray Herb.); vicinity of Twin Lakes, July–Aug., 1902, *C. Juday* (U. S. Nat. Herb.); pine woods, Mt. Princeton, alt. 3350 m., 22 July, 1892, *Sheldon 170, 489* (U. S. Nat. Herb.); Clover Mountain, above Garfield, alt. 3500–3640 m., 31 July, 1910, *Eggleston 6090, 6096, 6105* (U. S. Nat. Herb.); Sangre de Cristo Range, coll. of 1873, *Brandegee 719* (Mo. Bot. Gard. Herb.); Marshall Pass, alt. 3050 m., 19 July, 1901, *C. F. Baker 525* (Gray Herb., U. S. Nat. Herb., Greene Herb., Univ. of Notre Dame, and Mo. Bot. Gard. Herb.); Cochetopa National Forest, 29 Aug., 1912, *S. E. Piper* (U. S. Nat. Herb.); Little Ouray Mountain, 3 Sept., 1896, *E. L. Greene* (Greene Herb., Univ. of Notre Dame); mountains above Ouray, alt. 3655 m., 10 Aug., 1901, *C. F. Baker 756* (Gray Herb., Greene Herb., Univ. of Notre Dame, U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); Ridgeway, 18 July, 1917, *Payson 1085* (Mo. Bot. Gard. Herb.); Telluride, alt. 3655 m.,



Aug., 1894, *Tweedy* 352 (U. S. Nat. Herb.); in rocky places, La Plata Cañon, alt. 2740 m., 11 July, 1898, *Baker, Earle & Tracy* 524 (Gray Herb., Greene Herb., Univ. of Notre Dame, U. S. Nat. Herb., Field Mus. Herb., and Mo. Bot. Gard. Herb.); dry sandy soil in open timber, without definite locality, coll. of 1884, *Sheldon* (U. S. Nat. Herb. No. 49303).

Utah: Manti Cañon, alt. 2440 m., 3 Aug., 1895, *M. E. Jones* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); stony places, Mt. Peale, La Sal Mountains, alt. 3050–3350 m., Aug., 1899, *Purpus* 7004 (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.).

New Mexico: Valley of Santa Fé Creek, coll. of 1847, *Fendler* 437 [477] (Phil. Acad. Nat. Sci. Herb.); San Antonio Mountains, Sept., 1867, *Parry* (Gray Herb. and Mo. Bot. Gard. Herb.); Baldy, 4 Aug., 1910, *Wootton* (U. S. Nat. Herb.).

Var. **milleflorus** (Greene) Greenm. comb. nov.

*S. milleflorus* Greene, *Pittonia* 4: 116. 1900; Rydb. Fl. Colo. 395. 1906; Nelson in Coulter & Nelson, *Manual Cent. Rocky Mountains*, 580. 1909, in synonymy.

*S. lugens* var. *exaltatus* Eaton, Bot. King's Exp. 188. 1871, in part, i. e. Watson's No. 663.

Heads narrowly campanulate or subcylindrical; involucrel bracts somewhat narrower than in the species and but slightly or not at all black-tipped; ray-flowers commonly 3; disk-flowers about 7; achenes glabrous.

Distribution: southern Colorado and Utah.

Specimens examined:

Colorado: Pagosa Springs, 27 July, 1899, *C. F. Baker* 711 (Greene Herb., Univ. of Notre Dame, Gray Herb., U. S. Nat. Herb., Berlin Herb., and Mo. Bot. Gard. Herb.), TYPE; Pagosa Springs, alt. 2135 m., 15 July, 1893, *Benj. H. Smith* (Phil. Acad. Nat. Sci. Herb.).

Utah: in clefts of rocks, Mt. Millicent, Big Cottonwood Cañon, Salt Lake Co., alt. 2865 m., 28 July, 1905, *Garrett* 1522 (U. S. Nat. Herb. and Phil. Acad. Nat. Sci. Herb.); Bear River Cañon, Uintas, alt. 3050 m., U. S. Geol. Expl. of the 40th Parallel, Aug., 1869, *Watson* 663 (Gray Herb. and U. S. Nat. Herb.).

**131. *S. sphaerocephalus* Greene, Pittonia 3:106. 1896; Greenm. Monogr. Senecio, I. Teil, 24. 1901, and in Engl. Bot. Jahrb. 32: 20. 1902; Blankinship, Mont. Agr. Coll. Sci. Studies 1: 102. 1904.**

*S. altus* Rydb. Mem. N. Y. Bot. Gard. 1: 443. 1900; Nelson in Coulter & Nelson, Manual Cent. Rocky Mountains, 580. 1909.

An herbaceous perennial, floccose-tomentulose throughout; stems erect, 3 to 8 dm. high, from a horizontal or ascending stoutish rootstock, simple or sparingly branched, striate, rather leafy at the base, nearly naked above; radical and lower stem-leaves oblong-obovate to oblanceolate, 5 to 25 cm. long, 1 to 3.5 cm. broad, acute or obtuse, entire or shallowly sinuate-denticulate, gradually narrowed below the middle into a winged petiole, white floccose-tomentulose on both surfaces and, as well as the stem, somewhat glabrate; upper stem-leaves few, rather remote, sessile, lanceolate, the uppermost bracteiform; inflorescence a terminal rather close, few to several-headed corymbose cyme; heads about 1 cm. high, radiate; involucre broad-campanulate, calyculate, tomentulose to nearly glabrous; bracts of the involucre usually about 21, linear-lanceolate, 5 to 6 mm. long, pale green or occasionally somewhat tinged with purple and, as well as the bracteoles, brownish or black-tipped; ray-flowers 8 to 13, rays yellow; disk-flowers 40 to 60; achenes hispidulous.

Distribution: Montana to Colorado, west to Idaho and Nevada.

Montana: Spanish Basin, Madison Range, 17 July, 1896, alt. 1830 m., *Flodman 912* (Mo. Bot. Gard. Herb.); Spanish Basin, Gallatin Co., alt. 1980 m., 1 July, 1897, *Rydberg & Bessey 5258* (N. Y. Bot. Gard. Herb., Greene Herb., Univ. of Notre Dame, Gray Herb., U. S. Nat. Herb., Mont. Agr. Coll. Herb., photograph in Field Mus. Herb. and Mo. Bot. Gard. Herb.), *type* of *S. altus* Rydb.; Spanish Basin, 25 Aug., 1899, *Blankinship* (Gray Herb.); head of Brackett Creek, Bridger Mountains, alt. 2130 m., 16 July, 1902, *Blankinship* (Gray Herb.); Shield's River, Park Co., 20 July, 1902, *Blankinship* (Gray Herb.); Cottonwood Creek, Tobacco Root Range, alt. 2740 m.,

10 Aug., 1902, *Blankinship* (Gray Herb.); above Elliston, 5 Aug., 1889, *E. L. Greene* (Greene Herb., Univ. of Notre Dame).

Yellowstone National Park: Yellowstone Lake, Hayden's U. S. Geol. Survey, 1872, *J. M. Coulter* (U. S. Nat. Herb.); without definite locality, 3 Aug., 1885, *Letterman* (Mo. Bot. Gard. Herb.); Swan Lake Valley, alt. 2195 m., 14 July, 1888, *Knowlton* (U. S. Nat. Herb. and Greene Herb., Univ. of Notre Dame); without definite locality, 12 Aug., 1893, *Rose 179* (U. S. Nat. Herb.); damp woods, near Mammoth Hot Springs, alt. 2130 m., Aug., 1893, *Burglehaus* (U. S. Nat. Herb.); Upper Geyser Basin, 12 July, 1899, *Blankinship* (Gray Herb.); Lower Geyser Basin, 13 July, 1899, *Blankinship* (Gray Herb.); in a bog, Junction Butte, 15 July, 1899, *A. & E. Nelson 5889* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); without definite locality, 13 July, 1902, *E. A. Mearns 1773* (U. S. Nat. Herb.); Swan Lake Flat, 29 July, 1902, *E. C. Sheldon 296* (U. S. Nat. Herb.); without definite locality, 5 Aug., 1902, *Mearns 2862* (U. S. Nat. Herb.).

Wyoming: Union Peak, Wind River Mountains, 12 Aug., 1894, *A. Nelson 1002* (Gray Herb.); Union Peak, Wind River Mountains, alt. 2740 m., 13 Aug., 1894, *A. Nelson 999* (Gray Herb.); Dome Lake, 17 July, 1896, *A. Nelson 2379* (Gray Herb. and Mo. Bot. Gard. Herb.); Granite Creek, Big Horn Mountains, alt. 2740 m., 27 July, 1900, *J. G. Jack* (Gray Herb.); moist meadows, Doyle Creek, Big Horn Co., 26 July, 1901, *Goodding 362* (Gray Herb., U. S. Nat. Herb., and Mo. Bot. Gard. Herb.); without definite locality or date of collection, *Tweedy* (U. S. Nat. Herb. No. 49338).

Colorado: Graymont, 23 July, 1885, *Letterman* (Mo. Bot. Gard. Herb.).

Idaho: grassy stream-banks, Mackay (Bear Cañon), Custer Co., 31 July, 1911, *Nelson & Macbride 1436* (U. S. Nat. Herb. and Mo. Bot. Gard. Herb.); moist meadow, Alturas Lake, Blaine Co., alt. 1950 m., 12 Aug., 1916, *Macbride & Payson 3722* (Mo. Bot. Gard. Herb.).

Utah: Stillwater Cañon, Bear River, alt. 2590 m., 1 Aug., 1902, *Pammel & Blackwood 4290* (Mo. Bot. Gard. Herb.).

Nevada: "at the watering place and crossing of Humboldt River," coll. of 1872, *A. Gray* (Gray Herb.); Clover Mountains, 26 July, 1893, *E. L. Greene*, and at Deeth, 14 July, 1896, *E. L. Greene* (Greene Herb., Univ. of Notre Dame, Nos. 48047, 48048, and 48049).

(To be continued.)

## EXPLANATION OF PLATE

## PLATE 4

Fig. 1. *Senecio neo-mexicanus* Gray  
New Mexico

From type specimen, Wright No. 1415, in the Gray Herbarium of  
Harvard University.

Fig. 2. *Senecio Hallii* Britton  
Yellowstone National Park

From specimen collected by "C. R." in the Shoshone Geyser Basin,  
now in the Gray Herbarium of Harvard University.



GREENMAN — MONOGRAPH OF SENECIO

## EXPLANATION OF PLATE

## PLATE 5

*Senecio loratifolius* Greenm.

Mexico

From type specimen, Pringle No. 13676, in the Gray Herbarium of  
Harvard University.



GREENMAN — MONOGRAPH OF SENECIO



## EXPLANATION OF PLATE

## PLATE 6

*Senecio atratus* Greene

From specimen collected by C. S. Crandall at Georgetown, Colorado,  
19 July, 1892, now in the Herbarium of the Missouri Botanical  
Garden.



GREENMAN — MONOGRAPH OF SENECIO

COCKAYNE, BOSTON